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NEWSPAPER

NEWS IN BRIEF

L.A. County Chief Bars Hardware Buying

LOS ANGELES – A freeze on hardware purchases and a reorganization of the county data processing department will be implemented as a result of a $177,000 management survey.

Los Angeles County supervisors accepted the report, prepared by Arthur Andersen & Co., and directed that the recommendations be carried out as soon as possible.

Douglas R. Steele, chief of the management services division of the chief administrator's office, said the moratorium on new hardware is expected to last six or seven months.

During that time, he said, steps will be taken to give the administrator's office responsibility for planning, coordinating, monitoring and setting priorities for DP performance, as recommended by the Andersen report.

Further, the report suggested the establishment of an EDP advisory committee composed of seven user department heads with a DP department leader in the administrator's office to do most of the planning and coordinating.

The report was critical of the DP department's organization, planning, systems development and evaluation techniques.

Canadian Anik Satellite Could Benefit U.S. Users

WASHINGTON, D.C. – The recent successful launch of Canada's Anik I domestic satellite could prove beneficial to U.S. communications users.

U.S. and Canadian authorities have reportedly agreed in principle that the satellite could provide service within the U.S. Exact details of how the satellite facilities would be available in the U.S. will probably depend on negotiations between the Federal Communications Commission and Canada's Telesat corporation. The Canadian Parliament would probably have to approve the multinational usage.

On the Inside This Week

Users Awaken to Security Needs

FJCC Explores Data Protection

By Edward J. Bride
Of the CW Staff

ANAHEIM, Calif. – Users and system designers will have a good opportunity this week to look at where the computer community stands on data security, what progress is being made and what the trends are.

Committees, agencies, societies and corporations will all be taking advantage of the Fall Joint Computer Conference (FJCC) by holding public meetings or working sessions, and by presenting technical reports on the problem of, and solutions to data security.

Differing from physical-access control and from environmental considerations such as power, humidity and temperature, data security is now recognized as a separate but vital planning consideration since data thefts were first reported over two years ago.

Examining the problem from new or different angles has become somewhat popular and the last to climb on the bandwagon was IBM, which last spring announced its long-term, $40 million project to develop secure systems.

At the time, IBM Chairman T.V. Learson said the project was started in anticipation of an eventual public outcry or "market" for security.

But the recent guilty plea of a West Coast programmer who stole a proprietary program by long-distance telephone, apparently without ever setting foot in the DP center which he victimized, may hasten that outcry.

Spotlight On Security

Certification Task Force

Some time during FJCC the Afips Systems Improvement Committee will probably spend the better part of a day evaluating the progress towards system certification.

This working session will bring committee members up to date on the 300 or 400 sample questions that have been proposed as a first step in judging a system's security, one source noted.

Other information on the project was scarce, since this meeting will apparently

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Guarding Centers Primary Concern

By E. Drake Lundell Jr. and Molly Upton
Of the CW Staff

Sophisticated computer users are becoming increasingly concerned about the security of their data as well as their center locations and would even pay more for effective security measures.

At the same time, however, few users have installed super-sophisticated data protection devices such as scramblers and encrypters, relying more on personnel screening and hierarchies of passwords to protect sensitive data, a recent *Computerworld* survey of large computer users found.

Computerworld examines various aspects of security as a special theme of this issue.

And even with the increased awareness of the need to protect sensitive data, most users still put most of their security efforts into the physical protection of the centers, the survey found.

'Very Important'

All of the users surveyed indicated data security was "extremely" important to their installations, but they also said it was difficult to make the trade-offs between the need for security and the legiti-

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User Blasts IBM Reaction To 3d-Party Lease Choice

By Michael Weinstein
Of the CW Staff

DOVER, Del. – The director of data processing for the State of Delaware has charged IBM with trying to ruin his career because he chose another source for computer equipment.

"On the morning of Nov. 14, an IBM representative came to my office and in the presence of witnesses, informed me that I was 'finished' in the state," Arthur Hill, director of central data processing, said.

The IBM representative, according to Hill, stated IBM had planned to support Hill in the new state administration, but his decision to go to third-party leasing changed all that.

According to Hill, he was told that key legislators, newly elected officials and key personnel in the present administration would be contacted on this new development. And in a few hours calls began coming into the director's office from "politicians" who had been contacted by IBM, Hill said.

"I do not intend to back off from what I consider a direct attack by IBM," Hill asserted. "I think that as more people become aware of why we went to a third party, it will be shown that we have acted in the public's best interest," he said.

Problems Evolve

The situation actually began in December 1971 when a long-range plan was published for a centralized state data processing service, slated to begin in January 1973. But the problems began in May 1972 when a growing workload in the DP department and a realization that the long-range plans could not be implemented in the near future led Hill to look for alternative solutions.

IBM submitted a hardware configuration proposal, at the same time requesting that an order be placed to establish a date in the production schedule which then had a 10- to 11-month lead time, Hill stated.

Such an order was signed in late May

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Mini Users Gain Virtual Storage With Software

By Don Leavitt
Of the CW Staff

MANHATTAN, Kan. – Data General Nova minicomputer users can apparently gain many of the memory-expanding capabilities of a virtual system, without a Dynamic Address Translation (DAT) hardware change, by utilizing a new commercially oriented operating system from Computer Systems Design Inc. (CSD).

The concepts involved are essentially machine-independent and versions of the software are under development for other minis, the company said.

The CVS/72 operating system replaces Data General control software and is said to be powerful enough to support eight users on an 8K "real memory."

Programs may be of practically unlimited size since the total disk space

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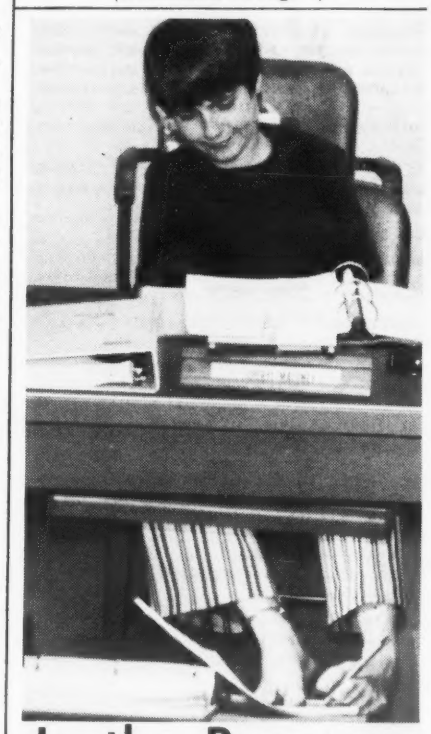


In the Program

Although born armless, Cheryl Lee Maloney last month completed the U.S. Army Computer Systems Command's ADP programming instruction course with flying colors. She has learned to perform most manual tasks, including keypunching and writing, with her toes. Cheryl likes the programming field "because it was a challenge and I like challenges."

But Vendors Secure the Weights

Disk Pack Balancing Proves to Be a Weighty Problem

By Ronald A. Frank
Of the CW Staff

Some users of IBM 3330 disk systems have found that lead balancing weights on their disk packs can become dislodged and damage the drive.

The problem apparently has occurred with independent 3336-type disk packs now available from several manufacturers. In each case, the vendors have taken corrective measures and assured users that future problems with their disk pack balancing weights will not occur.

The disk pack in the 3330-type disk system must be able to withstand rugged operating conditions. The pack spins at 3,600 rpm and must be balanced to spin true, much the same as an automobile wheel.

Heat, Centrifugal Force

At the high operating speed, heat builds up along with centrifugal force and these factors can combine to cause problems with the balancing weights which originally were affixed to the pack surface with adhesive.

Lead weights affixed to hub of 2316-type pack.

The first 3330 disk systems were delivered last year and independent packs became available shortly thereafter. Apparently the adhesive used on some 3336-type packs could not withstand the centrifugal force and the weights became dislodged.

When a lead weight becomes dislodged at high speeds, it "splatters" against the inside of the disk pack chamber and can damage the read/write head and drive mechanism, according to one user.

"We did have a 3330 system go down," one user said, "but I can't be sure that this was related to the disk pack." It is possible that the IBM field engineer also took some corrective measures on the pack, but if this happened, he was not aware of it, the user said.

IBM said it is not aware of cases where balancing weight problems occurred with 3336 packs, but most of the independent suppliers admit the problem existed with prototype packs earlier this year.

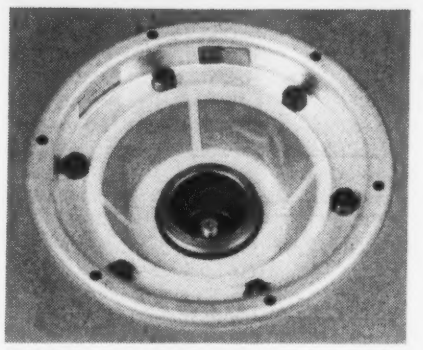
"To our knowledge, our customers have not experienced this problem with IBM-manufactured 3336 disk packs," an IBM spokesman said. One independent 3336 disk pack supplier was less emphatic. "We are aware of isolated incidents where weights have come loose from various manufacturers' problem. But the problem is not significant," a spokesman for 3M Co. said.

Possible Problems

But a dislodged balancing weight "could cause problems," according to IBM. "The physical characteristics of the spinning disks would change because the device is thrown out of balance," the company said.

A spokesman for Nashua Corp., which also supplies the 3336-type packs, said the company was aware some weights had come loose. The Nashua balancing weights are now attached within a special retaining ring that holds the lead pieces securely and makes it virtually impossible for a weight to become dislodged, the spokesman said.

Probably the most elaborate fix for the loose weight problem is fashioned by Caelus Corp. The company has devised specially weighted brass screws affixed into six threaded mounting holes in the hub of the disk pack. By eliminating any kind of exterior weight on a surface of the pack, the chances of anything flying off the pack are also eliminated, a Caelus spokesman said.



Weighted screws are now used by Caelus instead of the lead weights.

It is not clear how many users actually had a disk run interrupted by a dislodged pack, but the problem seems to have been virtually eliminated. A survey of 10 users by *Computerworld* showed several had experienced the problem. But each of these indicated the last incident was two to four months ago.

Most users contacted said they are satisfied with the performance of the 3330 and current versions of the independent disk packs they are using.

User Blasts IBM Reaction

(Continued from Page 1)

with the following condition:

"Several factors impacting the final decision on this order remain unresolved, including the possibility of a third-party lease. A final decision will be made in writing by Oct. 1, 1972. Your understanding and acceptance of this order under these conditions is appreciated."

Meanwhile, the state was soliciting information on leasing companies for a possible interim solution to the workload problem. From this search the decision was made to provide an interim upgrade which would allow time to fully develop long-range requirements and respond to all user needs, Hill added.

A formal request for quotes from third-party lessors to replace two 360/40s was profferred.

IBM's proposal was for an upgrade to a 370/145 with around 500K memory. (Originally IBM wanted to sell the entire system – including disks, tapes and other peripherals, but Hill stated he made it clear the state was only interested in the CPU since it had very good buys from other sources for peripherals.)

"We strongly considered IBM's recommendation," Hill said, but after reviewing seven bids, recommended the state accept the bid of Greyhound Computer Corp. for an IBM 360/75.

This recommendation was based on a significantly higher capacity for data throughput at significantly lower cost, offering an opportunity to save in excess of $100,000/yr, Hill noted.

Immediately following his recommendation, Hill claimed IBM offered to modify the delivery schedule of the tentative May order and requested the state accept delivery of the IBM system in September.

On Sept. 29, the IBM order was cancelled by the state.

IBM reacted with a letter to the state claiming the state was making "a commitment to seven-year-old technology," and suggested officials would be better advised to spend more time evaluating a long-range plan of operation.

"It is not the intent of IBM management or that of The Corporation to say or do anything that would be a threat against an employee of a valued customer.

"Any such action is clearly against IBM policy and the established practice of years of service in the data processing industry."—IBM's Statement.

Further, the letter stated, "there appears to be serious question as to the effectiveness of the direction taken in centralizing data processing."

'Reactionary' Letter

Hill labeled the letter "reactionary and emotional," maintaining it was directed primarily at "arousing the anger of politicians who are for the most part laymen in the field of data processing.

"It is intended to accomplish two main objectives: first and foremost, to force the early replacement of the current director of data processing by unjust criticism; and second, to insure the continuation of IBM as the primary and sole-source vendor of computer central processors to the State of Delaware," he stated.

As for IBM's reference to the state's long-range plans, Hill said the state has a plan, but it does not happen to conform with IBM's plan.

"The key appears to be that the state must go in the direction that IBM believes in," he concluded.

State officials have met with both Hill and IBM representatives in an effort to resolve the conflict, but no decision has yet been made.

Software Adds VS for Mini Users

(Continued from Page 1)

attached to the mini is treated as virtual memory for the system, a firm spokesman explained.

CVS/72, in its current implementation, supports a subset of an extended Basic, which doesn't handle some of the features of the original Dartmouth language, but does include backing for string operations and formatted I/O to make it more useful in commercial environments. Since Basic is its only language, the system is strictly conversational and has no batch-processing facilities.

The operating system allows the user or users, working from teletypewriter or CRT terminal keyboards, to create, edit, save, delete and execute programs. Disk file organization is handled by the CVS/72 logic.

Ascii-Oriented

Formatted I/O is an Ascii-oriented device and direct access to disk files is provided. I/O drivers to other peripherals can be easily added, the company said.

The virtual memory operation to and from disk is transparent to the user in terms of any special programming requirements, but the eight-user implementation does cause some degradation in response time compared to the single-user version, the company admitted.

The paging is handled strictly as a software operation. In the absence of a DAT box, the Basic processor, which is interpretive in any case, handles the address translation as well as the "decoding" of the instructions.

A single-user version of the system will operate in 4K of core storage but since the operating system itself takes almost half that space, CSD recommends more than that theoretical minimum of real storage.

While many users consider virtual storage solely to support several simultaneous programs, the simplest of the CVS/72 implementations will allow even one user to work with programs larger than he could handle with conventional control software.

CVS/72 requires at least one disk drive, but presumably can handle as much disk storage as a user wishes to hang on his mini, although there would be an increasing degradation of execution time and keyboard response time as amount of disk space increases.

CVS/72 is available under license agreement for $2,950 for the single user version, or $6,900 for the multiple user version. Delivery on the multi-user system is scheduled for March 1973.

CSD can be reached through P.O. Box 972, 66502.

Oregon Profiles Drivers

SALEM, Ore. – The state Motor Vehicles Division is compiling a computerized statistical profile of Oregon's 1,300,000 licensed drivers, to be used in implementing a driver reexamination program pending approval by the 1973 legislature.

The statistics will focus on age and sex of drivers, compared with accident statistics by age and sex of driver.

The study will also look at driving experience, number of licenses issued with restrictions and the number of drivers who are accident and violation free.

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Tape drives. (Configurations to go with both IBM 360 and 370 systems. See next column.)

370

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Users Seem More Concerned With Center Protection

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mate needs of users of the systems.

Because of these tradeoffs, most users admitted they do not use encryption devices, but almost all said they are studying the use of such devices.

If a successful and workable data security system were available, approximately 80% of these large users said they would be willing to pay up to 10% more on their monthly equipment rentals for such a system.

Some users indicated they would only be willing to pay a maximum of 5% extra, but these were generally extremely large installations with very high monthly rental costs.

"Of course," one said, "we would have to evaluate anything that came from the manufacturers to see whether it was as good as the moves we have already made in-house and it would have to be less expensive."

"I'm not sure we would go to any system of protection offered by the manufacturers," another stated, "because our present system is proprietary – no one knows what we are doing. If there was one system offered by, say, IBM, then the potential thief would only have to figure out how to break into it and would have to access to everyone's files.

"But," he added, "we would have to evaluate it and see if we could adopt such a system to make it secure."

About 90% of the users interviewed said they take advantage of some sort of password system and approximately 75% have hierarchical password systems which restrict access to particularly sensitive information from everyone except a certain small group of employees.

Most of the password users also change the passwords regularly, most often on a quarterly basis, but occasionally on a monthly rotation. A few (20%) change the passwords on a random schedule.

This type of protection also extends in some cases to tape and disk libraries with users having several libraries, ranging from the non-sensitive, and therefore more accessible, to the super-sensitive and therefore carefully controlled.

A majority of the users surveyed do not trust operators to handle printouts of sensitive information such as salary data and marketing forecasts.

"We have a separate center," one said, "where we run most of our payroll. None of our regular operators is allowed in this center, only personnel who have been carefully screened."

Few of the users have instituted strict screening procedures for DP personnel – i.e. stricter procedures than were applied to other employees – but several have, and a majority wished they could institute such screening.

"I would like to see more screening for our personnel," one DP manager said, "but as it is now, we have no basic procedure. We do, however, restrict sensitive data to certain job functions and it is unlikely that a new employee would have access to such information."

Employee Screening

One user with fairly strict procedures for personnel screening said his firm not only runs a pre-employment screening on all potential employees, but that it updates that screening on a periodic basis without the employees' knowledge.

"For people with access to sensitive information," he said, "we check them out pretty thoroughly occasionally to make sure they haven't gotten in a situation where they might be coerced into compromising our data," he added.

"This is where your security has to come from. People can always find ways to compromise the system if they want to enough. You've got to make sure that your people are loyal and trustworthy," he said.

Another user indicated he felt the trend to more screening of personnel is a "healthy trend," even though he did not want to say whether his company presently uses such screening procedures as credit checks and police records after an employee has been hired.

In most of the organizations surveyed, the DP manager is either in complete charge of determining security guidelines or has a large voice in establishing the procedures along with the firm's director of security, who, incidentally, seems to be mainly former FBI agents.

Generally, however, the responsibility for enforcing the security precautions is split among several people or groups of people.

In describing a fairly typical arrangement, one user said: "Enforcing our guidelines is basically the responsibility of everyone in the organization. But the DP director and the security director are directly responsible on a day-to-day basis and the internal auditors on a more long-range basis."

Concerning the present IBM study on data security procedures and arrangements, most users agreed with one DP manager who said: "If they're going to spend $40 million, I would think they will come up with something good. We'll be watching it closely to see whether we can apply their methods to our installation."

U.S. Data Banks Cross Boundaries

By Ronald A. Frank
Of the CW Staff

WINDSOR, Ont., Canada – Large and important stores of information about Canadians have been located in the U.S. and some data on Americans is being stored within Canada, according to Robert Stanbury, Canadian Minister of Communications.

These data bases, beyond the territorial reach of national authorities, make it more difficult to assure an "essential core of privacy" for each individual, Stanbury said.

Personal data on Canadians stored in the U.S. is not necessarily more susceptible to invasions of privacy but such data "is beyond the reach of Canadian jurisdiction and its magnitude does raise questions," Stanbury told a recent meeting on Canadian-American relations at the University of Windsor.

Citing a small "reverse flow," Stanbury said one U.S. school "deliberately located its files of campus organization memberships in Canada, beyond the reach of U.S. authorities."

While stating the U.S. has "led the way with such measures as the Fair Credit Reporting Act," Stanbury added that few formal protections for privacy exist today and most data banks are operated "on the basis of common sense and goodwill insofar as the personal privacy of individuals is concerned."

But these protective barriers are not going to be enough, Stanbury said, urging that stronger measures will have to be taken. "We do not yet have a privacy crisis," Stanbury said. Individuals have been hurt "but the occasions of damage are not widespread," he added.

To forestall any privacy disasters, Stanbury said, "we need to identify and prevent a recurrence of the worst excesses, and devise measures to predict serious problems before they occur."

Unless protective measures are taken, citizens will be subjected to a 1984 environment "where individuals can no longer control their own lives because their private information space has been obliterated."

Computers can increase "the likelihood of invasions of privacy," but at the same time they make it easier to apply "privacy-protective rules" if a decision is made to devise such rules, he said.

The solution, "easy to state . . . but hard to apply," lies in protecting privacy where it is threatened "without interfering with the flow and acquisition of information," the Canadian minister said.

Bugging That Boll Weevil

COLLEGE STATION, Texas – A computer program at Texas A&M University here is being used to simulate cotton plants and to predict the effect of parasitic insects on pests such as the boll weevil. The project, known as BUG, will study the possible use of insects for pest control, to replace prohibited chemicals.

FJCC Explores Data Protection

(Continued from Page 1)

be devoted to assessing whether the efforts are asking the "right" questions, and whether they comprise the proper approach to the overall problem, sources said.

Overlap No Concern

John Gosden, chairman of the committee, discounted the danger that the efforts of several groups might overlap.

Gosden said there are many aspects to the security problem, and each group or company will examine a particular aspect.

The Afips project is also part of a long-term effort towards system certification, and security is just one aspect of an even bigger project, he related.

Regarding other groups studying security, he likened the situation to many craftsmen trying to protect records, such as the financial accounts of a company. One person might be devising "locks and bolts," while another might be establishing rules under which records should be locked up – and another person might be an auditor, trying to establish procedures for authorizing certain people to access those records, he suggested.

'Exploratory Mode'

There will some day be a need to coordinate all these efforts, but the projects are in an "exploratory mode" today, Gosden said.

As for the other organizations involved in this issue, Gosden said IBM had not released much information on its comprehensive study, and he had not seen the National Academy of Sciences' (NAS) report on the social aspects of security and privacy.

This last study was scheduled for publication this month, and Dr. Anthony Oettinger, chairman of the NAS Computer Science and Engineering Board, is expected to comment on the study during his luncheon speech at FJCC, Dec. 7.

'Poorly Understood'

One of the FJCC technical session chairmen said the determination of what level of protection is adequate, and "the cost-effective selection and implementation of appropriate safeguards" are "difficult and poorly understood processes."

To solve some of these problems, or at least better understand them, a Tuesday evening session on the privacy and security of data bank systems is scheduled [CW, Nov. 22].

Rein Turn of the Rand Corp., chairman for the meeting, is expected to give a progress report on a two-year contract Rand has with the National Science Foundation, also on the security problem.

His study is at about mid-point, Turn reported, and one of the more difficult aspects has been measuring the value of information to be protected, he said.

He is to present a mathematical model to aid in this judgment, focusing on the three variables of the problem, that is, the worth of the data to three classes of people – such as a business client or a criminal subject, the owner of the data base and the potential intruder.

He said his project is devoted to theoretical and mathematical aspects of the security problem, and not the social aspect of privacy, which is a "political" question.

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The other 60%.

But what about all the rest of you who don't need all that extra throughput or all the added peripherals?

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How Should Society Respond?

Use of DP in Justice Systems Ignores Social Issues

By E. Drake Lundell Jr.
Of the CW Staff

WASHINGTON, D.C. – The use of computers in criminal justice information systems may raise serious philosophical and social questions that are not even being studied today, James W. Evans and Robert A. Knisely of the U.S. Department of Housing and Urban Development said here recently.

Discussing the on-going development of Integrated Municipal Information Systems, they indicated that "surprisingly little research has been conducted on the possible secondary impacts of computers on the criminal justice system."

To date, they indicated, most of the studies have dealt with improving day-to-day efficiency of the criminal justice delivery system, but not with the underlying social questions that are raised about the criminal justice process.

For example, they asked, if computer-based systems can accurately predict those persons who will probably be criminals, what should be the response of society?

"The problem is serious, because the foreseeable impacts will greatly affect the current operations of the police, the courts and corrections. Moreover, these impacts may call into question the very nature of the criminal justice system itself," they said.

"If statistical analysis of antisocial behavior can predict with compelling certainty that a given adult would continue with antisocial behavior, or that an infant in a given environment was fated to a life of crime, can society and the cirminal justice system respond in a manner which presumes free will?" they asked.

Computer systems "may demonstrate exactly this predictability – the involuntary character of the antisocial acts of certain individuals."

"The purposes of incarceration are deterrence, punishment, rehabilitation and separation. If an individual already has a criminal history, or comes from a social environment conducive to antisocial acts, the computer will predict quite accurately the individual's chances of entering, or returning to, the social system.

"At such a point, society's continued presumption of the individual's free will would simply be an excuse for ignoring the failure of another agency, the individual's family, or society itself," they added.

Computer systems, however, might also help by pinpointing individuals or social situations that need attention, therefore focusing the resources of society on the individuals and families."

In the future, the pair noted, however, computer-based information systems will be able to predict "with startling certainty" which criminals are unlikely to respond to any rehabilitation efforts.

"By examining the records of many prisoners and habitual offenders the computer may make it inescapably clear that although one cannot predict with total certainty the fact that an individual will remain a criminal, the probabilities are so high as to raise a presumption that he will."

Because the use of computers in criminal justice systems raises such basic questions, the pair said "it is not enough to computerize existing systems, nor to anticipate changes in daily operations or personnel requirements.

"The criminal justice system, and other social systems, must look to the future to discern the likely impacts of the information revolution."

DP Takes Some Heat off Building

Special to Computerworld

SYDNEY, Australia – Computer programs developed by Australian research engineers are making it possible to better predict the air-conditioning requirements of buildings. Air-conditioning systems account for some 20% of the current expenditure of $180 million annually on office construction in Australia.

The computer methods of estimating optimum conditioning plant sizes for a wide range of climates and of building types are faster and more precise than calculations from empirical tables and allow fine adjustments in plant capacities to meet particular conditions.

Three Programs

Three programs have been developed by the mechanical engineering and building research groups in the Australian Scientific and Industrial Research Organization, a wing of the Federal Government.

One of the programs allows predictions of energy requirements, running costs and the size of plant required for a particular building. Good correlations have been obtained in practice between the predicted office temperatures and those actually achieved.

An interesting application of this program has been to achieve significant economies of plant size by allowing a predetermined swing in temperature in offices according to the varying heat load throughout the day.

Scientist Knows – U.S. the Best

GREENCASTLE, Ind. – U.S. computer know-how is the best in the world, according to space scientist Sigurd A. Sjoberg, deputy director of the National Aeronautics and Space Administration's Manned Spacecraft Center in Houston.

Sjoberg, honored by President Nixon for directing the safe return of the aborted Apollo 13 mission, offered his remarks on computer technology at a science symposium at DePauw University.

"An excellent example of space-stimulated technical progress is the impact of new space requirements on the computer industry," he noted.

"Nasa has to receive advanced computer hardware, meeting rigid specifications on schedule to meet unyielding planetary launch window dates. We need new kinds of computer programs, and we know that complex software programs require lead-times as long as the hardware," Sjoberg added.

"Challenging the best talents of our nation in this way, to produce both hardware and the programming that makes it useful, has helped the U.S. computer industry to attain its present dominant world position."

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Environment Symposium Focuses on National Nets

By Doreen J. Utman
Special to Computerworld

CINCINNATI – The use of computers and computer networks to disseminate information concerning the problems of the environment was highlighted at the recent National Environmental Information Symposium here. The three-day conference, sponsored by the U.S. Environmental Protection Agency, brought together more than 2,200 representatives of industry, government, science and citizens action groups.

The purpose of the conference was to outline and clarify the difficulties of interchanging information in the myriad forms now available, to define user needs, and to describe some of the solutions already being formulated.

Medline Retrieval System

The Medline network was presented as one of these solutions by Davis B. McCarn, acting associate director, Science Communications and Computer Engineering Service, National Library of Medicine. Medline is one of the few operating computer information and retrieval networks in the country, McCarn said.

It provides an on-line interactive bibliographic searching of biomedical journal literature for over 120 users in hospitals, medical school libraries, federal institutions and the regional libraries of the National Library of Medicine, he said.

Medline now gives over 9,000 response/mo to inquiries and this demand is soon expected to increase to 200,000 inquiry/yr.

The network has local access in over 40 cities in the U.S. and a Paris node was recently added to the system, McCarn said.

Medline uses a variety of access systems, according to McCarn. These include the direct dial telephone net, direct dial TWX network, Western Union's Datacom lines and the Tymshare, Inc. network.

An IBM 370/155 at the National Library of Medicine provides on-line control and processing. Several types of terminals are used, including the Hazeltine 2000 and a 40-lb portable terminal, he said.

The data bases involved in the Medline system include more than 1,150 journal titles and over 490,000 citations with 10,000-12,000 citations added every month, McCarn stated.

The costs for this service are high, he said. Time-sharing is running at $10-$15/hr and retrieval at $30-$45/hr. However, with more users of the system, it is hoped the cost will decline.

McCarn believes there is a huge mass market for nationally available computer networks, similar to the TV mass market, and that the move is to larger decentralized data bases.

Land Use Network

Resource and Land Information (Rali), a system being designed by the U.S. Geological Survey, Department of the Interior, to provide land use and resource information, was described by W.A. Radlinski, associate director, U.S. Geological Survey.

Rali will operate within a functional framework of a national center, several regional centers and a multitude of local centers. This framework will permit a high degree of interaction with users at all governmental levels, Radlinski said.

Information will be provided in two broad categories. First, map data will be digitized into a grid format for compilation, interpretation, analysis and display by computer. Second, Rali will provide detailed coverage of state or local high-density areas for land use policy and planning, he stated.

William D. Ruckelshaus, administrator of the Environmental Protection Agency, said "information technology is potentially undemocratic." He stressed the danger that computerized information with a high operational payoff will reinforce the power of the managerial elite and tend to broaden the gulf between those who command the new technology and those who cannot.

Although he offered no direct solution to this danger, he asked the participants of the symposium to consider the problem and to try to find a solution.

Jules Bergman, the ABC-TV News science editor, called for a "U.S. watch" on the environment. This could be accomplished via satellite monitoring on TV and in libraries with display centers fed by a national network, he said.

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Editorial

Software — Where Now?

Computer users should begin immediately to press their congressmen for some resolution of the software protection issue now that the Supreme Court has ruled on the Benson-Tabbot patent.

After refusing that patent the court passed along any further action on the issue to Congress for discussion at its next session in January.

Meanwhile, IBM is heavily backing a proposal for a new type of software protection somewhere between copyrights and patents.

This system involves registration of the program and filing it with a yet-to-be-created office.

Besides IBM, several other hardware manufacturers are supporting this measure.

But at present the user voice is absent from these discussions.

And the users stand to lose the most, since they make a greater investment in software every year than either the mainframe makers or the independent software houses.

Users should study the IBM proposal, and if it does not suit their needs, they must be prepared to offer an alternative and push for its adoption in Congress.

The issue of software protection is too important to leave to the mainframe makers who are well prepared as lobbyists for their own viewpoints in the halls of Congress.

What Do You Stand For?

Your Philosophy Is the Beginning

Management

By Frank Greenwood, PhD

Your philosophy controls how you do business. Since your philosophy determines how you conduct your affairs, it decides what success you enjoy as a manager. Accordingly, you should know what you stand for.

How you do business includes the following:

• **Ethics.** Be strictly ethical, always. Your subordinates, superiors, peers and customers then know what to expect of you and what you expect of them. This helps everybody know what to do and what not to do. Further, by being strictly ethical you tend to attract and to hold high quality associates.

• **Decision-making.** Be objective, making decisions based on carefully gathered facts and not based on personalities or other subjective, emotional factors. You thereby get better decisions and put a healthy emphasis on "What's right?", instead of or "Who's right?" Also, you stay flexible, giving new facts a chance to speak for themselves – in contrast to closing them out and to locking yourself into old habits. Obviously, when the roof caves in you have to act immediately, making do with whatever facts you have.

• **Performance evaluation.** Judge people on their actual performance and not on their personal traits, sex, religion, race and so on. This sounds simple, but it means you have to agree with your subordinates on what constitutes acceptable performance and on how to measure it. Management-by-objectives can help you. It consists of repetitive cycles, each with four parts:

- Agree with every subordinate about what areas each is responsible for.
- Agree on his objectives for this particular cycle.
- Then, everyone performs his job over the period of the cycle.
- Last, discuss with each his evaluation of his results relative to his objectives.

To benefit from management-by-objectives you have to:

- Encourage individuals to be heavily *involved* in defining their jobs and objectives.
- Urge employees to *participate* in decision-making.
- Ensure that subordinates have *autonomy* in how to reach their objectives.

• **Environmental changes** – Be alert to changing factors critical to your environment so you can adjust and prosper. RCA stockholders and directors, for example, apparently tired of subsidizing the computer losses and disposed of the operation. In contrast, leisure-related products and services seem to prosper. For example, getting a week-end reservation in Reno has to be done considerably in advance, and snowmobile sales have climbed fast. Presumably, such leisure industries offer opportunities for computer professionals. Such developments and changes in your environment are opportunities or death sentences. Therefore, you need to perceive important trends as they germinate so you can adjust to them as opportunities.

• **Time** – Your competition forces you to get on with your job. Time is too precious to waste. Do not waste time trying to correct the weaknesses of your associates. Quietly work around their weaknesses and build on their strengths. Do not waste time hoping a difficult problem will disappear. It is almost always tougher later, so come to grips with it now.

• **Service** – Service to users is the reason we are on the payroll. There are users you cannot do enough for, however, such as the one who deemed it inadequate when a programmer offered to cremate himself so this user could sprinkle the ashes on his steep driveway that winter.

Good management starts with the boss. He must want to establish it and he needs to know how.

He begins by defining his philosophy of how to do business. Ethics, decision-making, performance evaluation, environmental changes, competition and service are some of the important areas where he must know what he stands for.

When the boss determines his philosophy, he plans how to reach his objectives, organizes his resources, staffs the positions in this organization, directs the activities of the encumbents and establishes controls to ensure that performance conforms to plans. Throughout, he struggles to provide the necessary resources.

'Know Thyself'

Managing thus starts with your philosophy. Before you can manage others you need to know what you stand for. Since your philosophy shapes how you do business, it determines what success you enjoy as a manager. The above six points, therefore, merit your consideration.

(This column draws heavily on Marvin Bower's book, *The Will To Manage* (N.Y., McGraw-Hill, 1966). The managing director of the international consulting firm of McKinsey & Co. discusses the importance of a manager's philosophy in Chapter Two, "The Way We Do Things Around Here.")

Frank Greenwood is director of the University of Montana computer center.

Letters to the Editor

Foresight Shown On Certification

The Taylor Report on "DP Professionalism Can Be Advanced By Alternative Means of Certification" [CW, Nov. 1] was outstanding. Up to that time I had never known of the Society of Data Educators. I had always felt Taylor's CDP gave him eyesight problems.

Taylor is a credit to the field of data processing, a friend to quality data processing and a help to a data processing instructor.

Robert E. Sennet
Streamwood, Ill.

Telex Jumps the Gun

The article in the Nov. 15 issue headlined "IBM Approves Telex Add-Ons for 370/155, 165" is substantially in error.

IBM has given no blanket approvals to attach add-on memory to any of its systems. In the case of configurations of IBM equipment with non-IBM memories, we do make physical inspections of specific systems to determine whether IBM maintenance of unaltered parts of the IBM CPUs is practical.

No approvals have been given on configurations of the 370/165 with memories of other manufacturers to date. In the case of the 370/155, we have found it practical to maintain the unaltered part of the IBM CPU for certain specific configurations, including one involving a Telex memory, one a Data Recall memory and four involving AMS/Itel memories.

J.B. Macfarlane
Manager, Industrial Products Marketing
IBM
New York, N.Y.

While Telex admits it was premature in saying I M had "approved" the 165 add-ons, IBM has indicated to Telex and to *Computerworld* that where the add-ons create no maintenance problems, IBM will maintain the CPU. Ed.

Handling Certification

I heartily agree with comments in the Nov. 8 issue concerning the ACM-DPMA "foundation."

The certification question would be better handled by a coalition of societies; however as an ACM member, I do believe ACM's participation should be with the membership's approval.

The Consititution of the ACM, under Article II, "Purposes," does not mention anything associated with either certification, testing or the establishment of joint "foundations." Consequently, a change in the Constitution would seem in order. Such a change requires that one-third of the membership vote, and of those voting, two-thirds approve any change. (Article 12, "Amendments," Section 2.)

An alternative would be to submit the proposal to the ACM membership as a "Question of Importance" in accordance with Bylaw 10.

Section 1 "Scope" states: "Questions of importance may include any question relating to *policies* or public position of the association, changes in the consitution, *affiliation with other societies*, or the holding of business meetings."

Obviously, those rules which appear in the Constitution and Bylaws of the ACM may be interpreted to suit the convenience of those elected, unless the members themselves make known their wishes.

I also oppose approval of any venture without adequate membership knowledge.

Fred N. Brand
Los Gatos, Calif.

'First the New Math, Then Women's Lib and Now This!'

'Billing Date' Example

Ambiguous Terms Endanger Effective DP Applications

When data processing departments prepare output, they must consider all possible uses of that output to ensure that the data will be both practical and accurate throughout the system.

Terms which may have a precise meaning for the DP application but which may be ambiguous in later uses can produce some unpleasant results.

The Taylor Report
By
Alan Taylor, CDP

For example, a credit card bill received by Mel Tolhurst recently included an entry "billing date" – Oct. 9. The bill did not say, however, just what the billing date meant.

The dictionary gives two meanings of "bill":

- To enter in or prepare a bill of charges.
- To submit bill of charges to.

Tolhurst's bill also gave a payment date – Nov. 4 – which was apparently derived by adding 25 days to the billing date.

Under the rules of the Bankamericard, any breach in receiving payment by the payment date results in a finance charge.

However, under the rules of an equally well-organized system – the "Tolhurst bill-paying system" – the use of billing date as a date of preparation, and as a basis for unilateral finance charges results in a form letter to the company telling them to cancel the charge (see box).

The Billing Date

Leaving aside the question of Tolhurst, who seems quite able to look after himself, let us take a look at the problem of the billing date.

Can we tell whether or not Bankamericard used the first dictionary definition – the date that an item was prepared – as distinct from the date the bill was submitted? Clearly, if they did not even mail the bill out until Oct. 16, then the second dictionary meaning of the date – the date the bill was submitted – is not even a contender. You can't submit a bill a week before you mail it – indeed you can't submit a bill until after the mail has been received at the other end, which can be days later.

Traditional Definition

We must remember that billing date has traditionally meant the date of preparation, following the practice of dating letters. In this context, the billing date is a method of distinguishing one bill from another bill. No one objected to this, practice – so should there be any objection now?

Clearly there is an objection. It springs from the use of the billing date to assess finance charges. The billing date is no longer a simple identifier – but an active item in the charging structure.

Under these considerations let us look again at the two definitions of "bill" in the dictionary: Submit a bill of charges or prepare a bill of charges.

Explicit Definition

An item which is an identifier – as the billing date used to be – need not distinguish between these two definitions. But an item which affects the pocketbook must be defined explicitly for the recipient.

The Bankamericard people could hardly expect to collect their finance charges simply by preparing the bills and not sending them out until after the payment date.

So it would appear that the use of ambiguous terms can be acceptable under one set of circumstances, and unacceptable under another.

Practical Throughout

Data processing users, when they use their dictionaries to check on the accuracy of the information they are putting out, have to do more than simply see that there is one version of the word that fits the description they have been using. They also must check on how the data is being used later – both in the data processing applications and elsewhere, and only use a version that is practical throughout the system.

Then we will be able to improve the general opinion of data processing both in Tolhurst's mind and in the minds of many other people.

One Man's Solution to 'Late' Bills

Two Sweetmans Lane
Englishtown, N.J.
Oct. 20, 1972

BT Credit Co., Inc.
P.O. Box 700, Ansonia Station
New York, N.Y. 10023

Subject: Finance Charge, Account No. **4250-132-002-723**

Gentlemen:

It is my normal practice to pay in full all bills received by me from the first of a month to the 15th within three (3) business days of the 15th and all bills received from the 16th to the 31st within three business days of the 31st. In most normal billing situations, this has the effect of eliminating any finance charge on the account since the typical payment date is 25 days from the billing date and the maximum delay in payment is 18 days.

I have noticed, however, that my payments frequently do not appear on statements of my account with you until one billing cycle subsequent to the one in which payment was made resulting in a finance charge and frequently, delinquent payment notices.

In an effort to preserve my credit rating, I have analyzed this situation and find that the overall reason for nonreceipt of payments by you prior to your "Payment Date" is your practice (deliberate or otherwise) of not mailing statements promptly with regard to the billing date, a practice I believe to be unconscionable if it is not yet illegal.

For your information in any investigation of this problem, I have attached a photocopy of my most recent statement, including its mailing envelope. As you will notice, this statement was not posted until 7 days after the billing date. This practice last month resulted in the finance charge of **$1.83** shown on this statement.

I would greatly appreciate it if you would credit my account with the excessive finance charge shown above and advise me of what steps you plan to take to correct this unconscionable practice of yours prior to what I believe to be the imminent enactment of legislation outlawing this practice. If you do not choose to do so, please consider this letter as a request that my account be closed.

As a member of the Society of Certified Data Processors, which society is in the process of establishing standards for the data processing community, I feel that I am obligated to point out to the society this example of what I consider to be an unprofessional data processing practice and will do so by a copy of this letter to the society as well as any government consumer agencies concerned.

Sincerely yours,

M.L. Tolhurst, CDP

Mel Tolhurst has prepared a form letter which he uses to request cancellation of finance charges. A copy of the letter is reproduced above, filled in for the case of an October 1972 finance charge from his Bankamericard account. If you care to emulate his approach, I would like to hear about it and about your successes or failures in obtaining adjustments.

Letters to the Editor

Does ACM Have Right To Speak for Majority?

I am an ACM member with very serious reservations about the general competence of its leadership. I do not question the academic qualifications of prominent ACM officers and the technical quality of their literature. However, I do not feel this gives ACM any right to speak for the majority of the profession.

For example, the recent extension of the deadline in the CDP application, due to a change in the weighting value of academic experience vs. professional experience, is an indication of what is to come in the CDP examination revisions.

Standardization and professionalism are desperately needed in this field, but if these things are promoted by a minority of professionals with distinctly special interests, the effort is bound to fail or be diverted to apply only to a special subfield.

ACM has shown professional incompetence in its own field in the handling of membership lists, publications orders, etc. Why not include organizations like IEEE? ACM membership, from a professional point of view, is expensive for the services offered.

James M. Knock
Sierra Software
Chicago, Ill.

IBM Has 'Every Right'

The wording and tone of the viewpoint article "U.S. Users Deprived Of Needed Product" [CW, Nov. 15] would have no place in a responsible newspaper, even if contributed by some reader rather than by one of the editors. The statements "IBM . . . is undeniably depriving . . . users of a product they need," "the action, for whatever reason, is indefensible" and "this situation should not be tolerated by any users" cannot be part of any rational discussion.

The writer overlooks the fact that IBM, and no one else, owns the 3740 system. IBM has every right to market the system as they see fit.

Needy users, on the other hand, have no inherent rights to the product, the author's claims to the contrary notwithstanding. In no sense can users consider that they are being "deprived" of something to which they have some right; the right of the user is limited to dealing with IBM or not.

Bennett M. Schwartz
Manager, Systems Programming
Warner-Lambert Company, Inc.
Morris Plains, N.J.

The Professional's Viewpoint

Effective Review of Cobol Standard Requires Understanding of Proposals

Many people are currently reviewing the proposed Cobol standard. In order to make these reviews as effective as possible, the SCDP Cobol Coordinating Committee (after meeting with Robert Kearney, chairman of the Bema-sponsored X3J4 Committee which is doing the technical review work) suggests the following precautions:

• Understand the documents involved.

There are three documents which are involved in the complete review – the proposed standard, the current 1968 Cobol standard and the Codasyl Journal of Development. These are prepared by different people, and can be obtained from, respectively, Business Equipment Manufacturers Association, 1828 L St. N.W., Washington, D.C. 20036; the American National Standards Institute, 1460 Broadway, New York, N.Y.; and the Canadian Government Specifications Board, Department of Supply and Services, 88 Metcalfe St., Ottawa, Ontario, Canada.

When referring to Codasyl Journal of Development, be sure to quote the update level, including the page changes made since it was issued.

• Understand what the proposed standard is and what it is not.

The standard is a standard for a language specification – and no more. It is only slightly concerned with Cobol compilers; it is not concerned with Cobol manuals (outside the acknowledgment section) or with Cobol programs.

Thus, suggestions that the compiler output should include specific items of information, or that Cobol manuals should differentiate between the items that are being developed as an experiment for general Cobol adoption, as opposed to those extensions included by the implementors on a proprietory basis, are simply not within the current scope of the review committee's concern.

This Professional Viewpoint Page was prepared by the Society of Certified Data Processors in conjunction with the editors of *Computerworld*.

• Understand which parts of the proposed standard are X3J4's concern and which are delegated to Codasyl's Programming Language Committee.

The technical parts of the standard have been drawn from two sources, neither of which are under the control of the X3J4 Committee. These are the 1968 standard, published by the American National Standards Institute, and the Codasyl Journal of Development published by the Canadian Government.

The X3J4 Committee and its senior committee, the X3 Committee cannot, under their rules, take any part of the language specification from any other documents.

The X3J4 Committee does have control, however, over Section 1, Chapter 1 of the standard – the introductory information and to some extent the details in the appendices. However, the appendices are not part of the standard and so again reviews of these areas are not necessarily relevant to the overall review.

• Know what action you wish to accomplish.

If as a result of your review you want to draw the committee's attention to a particular item, stay as close to the question as possible. There are three major types of action:

Ambiguity clarifications – If an item appears to be ambiguous, then note the fact, if all you want is a clarification of what is meant. If, however, you want to have the matter resolved in one particular way, then include a suggested rephrasing, together with reasons.

Preference for 1968 standard – If an item has been changed from the 1968 standard, and if you prefer the 1968 standard with no changes, ask X3J4 to revert to the old standard, and give your reasons.

Change in the specifications of the language – If you want to have a change made in the standard you have to persuade X3J4 to recommend it to the Codasyl Programming Language Committee.

No change can take place until a formal proposal to change the Codasyl Journal of Development passes through the PLC. Such a motion requires, in addition to a justification, a complete list of the word-for-word changes to be made throughout the full specification. Even for simple changes, this list can run into a number of pages, and an error on any of them can prevent the motion from being passed.

It is possible, of course, that some member of PLC will be so impressed by your ideas he will volunteer to do this work for you, and put your ideas into the proper form. You cannot count on this, however, and unless your ideas are put into proper form they cannot be used to change the proposed standard.

• Beware of relying upon the American National Standards audit routines.

Although the existence of some American National Standards audit routines for the new standard is referred to in the proposed standard document, they do not actually exist. Indeed, it is possible that neither these routines, nor the audit routines whose availability was announced in the 1968 standard will ever come into existence.

Robert Kearney, chairman of the X3J4 committee, said difficulties have arisen, and that no decision has been made as to whether to go on with the 1968 routines, concentrate on the new standard, or to admit that audit routines cannot be produced at this time, nor can be expected for some months yet.

– – –

Where possible, please send copies of your review of the new standard to Oscar Watts, Chairman, Cobol Coordinating Committee, 1627 Locust St., St. Louis, Mo. 63103. This will help the committee understand your problems.

Random Notes

Standard Files, Data Bases Input for Compile-Go 'RCS'

ST. LOUIS – IBM 360/370 users checking report writers for conventional files or for data bases such as IMS or Total now have another package to consider: Report Creation System (RCS) from McDonnell Douglas Automation Co.

It is a compile-and-go system that can print a report, punch cards and generate as many as 10 new data sets from one pass of a sequential input file.

RCS is available for a paid-up license fee of $10,000, or for $300/mo on a minimum two-year contract.

Savings Applications Run in 32K With Package From Florida Firm

ORLANDO, Fla. – Though it works in 32K bytes under DOS/360, Multiple Bank Savings System II is 25% faster than other commercially available savings account systems, according to the developer, Florida Software Services.

The package supports punched card and MICR input and accommodates statement, regular passbook, "golden passbook" and Christmas Club savings plans. It can process pledges and teller-initiated holds, and generate service charges when appropriate. Written in Cobol, the package sells for $5,000 from P.O. Box 2269, 32802.

$90 Two-Program Stat Package Applies Box-Jenkins Theories

MOUNTAIN VIEW, Calif. – Recent theoretical work by Box and Jenkins and others in the forecasting, identification and control of stochastic systems is included in the Boxjen packages from A.V. Cameron Business Systems. Two separate programs support the identification and preliminary estimation functions of the models.

Fortran source code and documentation for each of the programs cost $45, but since the estimating program depends on output from the identification run, the two are normally sold as a $90 combination, from 575 S. Rengstorff Ave., 94040.

UCC Opens Pittsburgh Facility

PITTSBURGH – University Computing Co. has opened a new DP center here to provide users in the Ohio, Pennsylvania and West Virginia area with easier access to the company's Univac 1108 and IBM 360/65 in East Brunswick, N.J.

Local users with their own terminals can link into the UCC network through normal dial-up. Users without in-house terminals will be able to access the 1108 through a Cope .38 terminal at the new UCC office, 1910 Cochran Road, 19220.

Widely Used Technique

Passwords Protect Data and Programs

By Don Leavitt
Of the CW Staff

When it isn't referring to physical protection for the computer installation itself, "security" may be linked to the protection of either programs or data files.

Data files are important – whether or not they contain "sensitive" information – and there are several techniques for protecting them against unauthorized use. But techniques to block unauthorized use of a company's application programs may be just as vital, since it may be the program logic that makes the data important.

Some companies find themselves in paradoxical situations. As members of trade groups, they freely swap generally useful, non-sensitive routines. But as competitors, they have to guard other programs which include algorithms they feel give them an advantage over others in the same business.

The requirement that a potential operator give a password or unique identifier before he can access the system, a program or a file, has become one of the most widely used security techniques – especially with the expanding use of data communications and the spread of terminals accessible to many, whether they are supposed to use them or not.

Less Obvious Places

But support for security sometimes shows up in less obvious places. Data base management systems, for example, are designed to help the user work more effectively with his data. In effect, they take over I/O control of the data base. As a byproduct, they also impose a certain degree of security that might not otherwise be there.

Some software houses include controllable "self-destruct" routines in their programs, generally to block extended use of a proprietary product on a pre-installation trial. But variants of these routines come into play if an authorized user fails to pay the agreed-upon rental, or if the package is stolen from a legitimate user.

Spotlight On Security

It seems likely a user could include comparable protection in his own programming, requiring the operator to validate his use of the coding or have it "blow up."

More conventional passwords can be used at a number of levels within a DP operation. Subscribers of time-sharing networks, for example, normally have to identify themselves before they gain any access at all to the CPU used by the net. This certainly is useful to the net proprietor as a means of allocating charges for his service, but in any case it is a hurdle to unauthorized use of the system.

Many systems go further. Users authorized to be on the system for one purpose may be unauthorized for others. Payroll data need not be accessible in a shipping department, just as inventory information is immaterial to payroll clerks. Application-level passwords control who can get at which programs.

(Continued on Page 17)

Data Tables Created, Searched By 'Trimax,' 'Autospil' Macros

PHILADELPHIA – A pair of programs from Trilog Associates Inc. provides 360 users with macro instructions for creating, maintaining and using data tables, files and large records in memory without subscripting or otherwise dimensioning control variables.

Both Trimax and Autospil can be used with any conventional programming languages IBM supports for the 360/370 CPUs. The macros can be included directly in the flow of Assembly language coding or accessed through CALLs from Cobol, PL/I or Fortran programs, a Trilog spokesman explained.

Though the packages perform essentially the same range of operations, they differ rather sharply in the scope of their approaches to the problem of table maintenance and searching. Trimax performs I/O only on user-initiated commands.

Autospil, on the other hand, can store – within a user-defined operation – table elements out on disk if they don't fit in memory, and can retrieve them as it needs them for processing.

This extra I/O function is transparent to the user, functioning very much like paging in a virtual memory system, and means that tables need no longer be restricted in size.

The operators provided in the package include OPEN, two forms of GET, PUT, RETURN, INSERT, DELETE and SORT. Macros are also included for binary, sequential, non-sequential and continuous SEARCHes, Trilog said.

User Additions

The technique used to create the Trimax/Autospil macros could be followed by talented users to create their own additions to the range of operators already available, but Trilog will only distribute the source code needed to write the macros under special arrangements with interested users.

In addition to avoiding subscripting and other error-prone methods of working with tables, the new packages enable users to standardize their installation's approaches to handling tables in general, the company suggested.

Trimax requires about 1K of storage in addition to the size of the user's matrix. Autospil is about twice as large. Each can be used under DOS or OS/360 and costs $2,100 for a paid-up lease, or $60/mo plus $60 for installation on a rental plan.

Trilog Associates is at 1700 Market St., 19103.

'Admis' Adaptable to Many Uses

ATHENS, Ga. – Created to coordinate documentation needed in support of the Apollo space program, the Automated Data Management Information Systems (Admis), operating on GE-635 equipment, appears to have capabilities that would be useful in other, more general applications as well.

Currently available from the Cosmic clearinghouse as program KSC-10619, Admis identifies documentation related to specific projects. The relationships may be either "horizontal" or "vertical," a spokesman said, so that users may locate, for example, all the reports that are supposed to be supplied a certain level of command, or all the sub-reports needed to create a final summary.

The system uses a document and distribution master file, a code file master and a common data file master. The document and distribution master contains all data oriented toward a specific document.

The code file catalogs all acceptable codes, and serves as the data-entry editing point in the system. The logic in the editing routines has been made somewhat "forgiving" so that incoming requests are not rejected because of minor deviations from the expected format.

The common data master file is the basis for maintenance on the document and distribution master.

A keyword subsystem generates a cross-reference listing and retrieves items from the master file on a keyword basis.

The entire Admis package, written largely in Cobol but with 20% in Gmap – thus limiting its transferability to other mainframes – consists of approximately 25,000 card images. It sells for $750, and documentation is an additional $172.

Cosmic is at 112 Barrow Hall, University of Georgia, 30601.

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Compression Shields Data While Operations Improve

Spotlight On Security

By Don Leavitt
Of the CW Staff

Security-conscious users who don't want to go as far as encrypting to protect their data have other options available to them – sometimes in surprising ways – from various vendors.

Data compression utility packages have generally been designed to help the user save space on his tape and disk files. In several ways, they can provide enhancements to the overall DP operation.

They certainly were never intended to provide security for a user's files. They just work out that way – to an extent.

Compression packages function by collapsing "extra" repeated characters, whether blanks or actual data, into a single character or into a single bit, on the character ahead of the compression, as a signal of what is being done. Some compression routines go further: "packing" alphabetic characters and, in effect, "double packing" numerics.

That technique not only allows two alphabetics or four numerics to be carried in a single byte on the 360; it creates bit structures that are not normally recognizable by any "data thief."

The security capabilities of this technique actually start at a much simpler level. Compression allows the same amount of data to be stored on fewer tapes or disks. A reduction in the number of tapes or disks means a reduction in the resources needed to protect them.

Beyond that, however, the user gains considerable security once the compressed data files are mounted on peripheral devices and ready for use. No one can mount a tape full of compressed data, for example, and print it using a conventional utility package from a hardware vendor.

The standard programs will produce some sort of printout, but it will be largely unintelligible and very likely filled with blanks as the print system will be unable to properly interpret the compacted characters.

By the same token, even a special program to extract material, in detail or in summary, wouldn't do the unauthorized user of a compressed file any good, unless he had access to the particular compression/decompression module that was used to create the file.

Communication is certainly one of the areas in which users are very concerned about security of their data. Compressed data appears, at first, to have two advantages: it should be more secure than clear text and, since it is made up of fewer characters, it should be able to transmit in less time.

The fact is, however, that there may be problems in attempting to use compressed data on communications networks, and the problems may have nothing to do with transmission speeds or the user's program logic.

Much DP equipment, and especially communications gear, is sensitive to what it deems to be invalid characters. The results of compression would most likely fall into that category.

If compression doesn't provide as much security as encrypting, it doesn't provide as many operational problems either. There are no user-supplied passwords required to compress or decompress data.

If a file is compressed by the program that created it, it generally has to be treated as compressed by all the programs that use it. Therefore every program that uses the file has to include the compression/decompression coding.

In the normal course of events, this inclusion would become part of an installation's standard operating procedure and therefore would be no real problem for the programmers. However, the common use of the coding – which is unchanged from program to program – makes this key to the compressed files easily accessible to the persistent data thief.

Compression and decompression of data adds time to the normal application processing. To keep this overhead under control, the user can limit compression to specific files within a program.

Compression in some of its implementations can be used selectively within a file. Thus, fields that are needed for sorting or for matching records can be left in normal format, while everything else is compressed. Records or individual fields that aren't needed for processing in a given program can be left in compressed form. This of course allows them to be passed faster so that the whole program runs faster.

Series 70 Users Get DOS-15

CINNAMINSON, N.J. – Better utilization of disk space in the core image library, improved use of the Series 70/590 disk unit and the ability to support Univac DCT-500 terminals are among the features in DOS-15, recently released to Series 70 users by Univac.

Under the new release, users get to reuse core image library space when a program is deleted. The space immediately becomes available for another program even without reorganization.

Incoming programs are fragmented, if necessary, to utilize the space left by the deleted program. As much of a program as will fit in one "hole" will be linked by a pointer record to the next available "hole" in the library.

DOS-15 users are provided support for full-track usage of the Series 70/590 disk device. Previously, Series 70 DOS has supported only half-track usage.

Support of the Univac DCT-500 data communications terminals has been added for all Series 70 CPUs at transmission rates of 10-, 15- and 30 char./sec.

Cobol, Fortran and RPG processors have been enhanced, and Ucolt, a program that converts Spectra or second-generation (301, 501) RCA Cobol source code into ANS Cobol source, is available for the first time to DOS users. Ucolt has been part of TDOS and VMOS for some time.

Univac has also added emulation of the 501 system on Series 70/45, 70/6 and 70/7 processors; and emulation of the 301 system on the 70/6 and 70/7.

Interdata Releases Operating Systems

OCEANPORT, N.J. – Users of the Interdata New Series general-purpose or communications processors will be able to choose from four operating systems by early next year. The company has announced the immediate availability of improved versions of Basic Operating System (Boss) and a Real-Time Operating System (Rtos).

A full Disk Operating System and a Real-time Telecommunications Executive (Rtex) will be ready for shipment in the first quarter of the new year.

The systems are upward compatible from Boss through DOS and on to Rtos for general-purpose work, or Rtex for data communications applications. As part of the family of systems, Boss has been enhanced to include batch-processing capabilities and support for disk, drum and cassette peripherals.

The DOS user will be able to develop and maintain resident libraries of programs and data files on as many as four moving-head disks. DOS also provides for program segmentation, direct and random file access, file protection and overlapped I/O operations, the company added.

"Roll-in-roll-out" capabilities – allowing high priority tasks to replace and then restore less important work – have been added to the updated Rtos.

Rtex is said to emphasize high throughput and low core usage as it provides a software base for a dedicated communications application. Its scheduling and control algorithms support the concurrent execution of as many as 16 "prioritized" tasks. At peak capacity, Rtex-driven tasks can support message rates in excess of 30,000 char./sec, the spokesman claimed.

DOS requires 24K bytes of main memory on a Model 70, 74 or 80 CPU, a teletypewriter, high-speed paper tape reader/punch and a moving-head disk controller. Minimum hardware for Rtex should contain a Model 50 CPU with 16K bytes of memory, power fail/auto restart, teletypewriter, 8-line interrupt module and two universal clocks.

Passwords Protect Data and Programs

(Continued from Page 13)

Even that isn't enough protection for some users. They see some data as too sensitive for just anyone in a user department, and there can be extra passwords required to get at this super-sensitive data even if access to the application in general has already been cleared.

Access to specific fields, whether sensitive or not, may be limited to a given person or station's particular function.

Data-base management systems provide security even though they are primarily known for making the interface between user and data easier. They relieve the programmer of having to define files on each program by supporting a single "dictionary" of the entire data base, which may include many separate files.

The dictionary "knows" where the data is physically stored, but the user doesn't. Instead he is provided a list of the data fields (and their attributes) appropriate to his application. He references the data names given and his program gets to use them.

As long as each application group or user department maintains good control over its particular subset of the dictionary list, outside users cannot discover even the names the authorized user has for his data.

It's Not All Greek to Him

BEIRUT, Lebanon – Multinational companies with DP installations operating in the Near East can use conventional Cobol compilers even if their programmers are not conversant with English, through the intermediate use of the Arabic Business-Oriented Language (Arabol) preprocessor, developed by DP consultant A. Hannoush.

Arabol is a translator designed to accept a near Arabic language, punched on specialized keyboards, and convert it into English language ANS Cobol input on magnetic tape. A variant of the translator is expected to accept Greek and convert it to ANS Cobol, Hannoush said.

The Arabol input has Cobol format but some of the syntax rules will be altered to allow for peculiarities in the Arabic language. Recognizing that even ANS Cobol is not completely standardized from compiler to compiler, Hannoush will adapt Arabol to produce source code appropriate to a user's CPU.

In addition to producing a Cobol input tape, Arabol provides Arabic format validation routines, language diagnostics and an Arabic source list. The system generates an "untranslatables" list and both English-Arabic and Arabic-English cross-reference lists. Arabol allows mixed Arabic and English statements.

The translator is designed to operate in a 4K-byte environment. Price of the package is currently open to negotiation. Hannoush can be reached through P.O. Box 3155, here.

Too Dramatic For Most?

Encrypting Routines Offered, But Not Widely Used

By Don Leavitt
Of the CW Staff

Privacy of data files can be assured, even when the files are out of the owner's physical control, by using cryptographic techniques. Data can be encoded into a form that unauthorized persons cannot decipher and the enciphering is done as part of the program that creates the file. Only a program using the matching deciphering technique can use the data.

Data Theft

The possibility of theft or unauthorized use of data is being aggrevated by the use of data transmission, not only over common carrier lines, but through the mails as well. Sending tapes, disks, or card files from one DP center to another, and the increasing use of time-sharing services often means that data cannot be protected in conventional ways.

Several of the time-sharing vendors recognize this problem and offer encrypting of data files as a service for concerned users. Various software houses have offered packages, normally modules to be added to the user's own program, to do

Spotlight On Security

the job on in-house CPUs. And yet, there has been no great demand for this type of support, perhaps because there are some user problems involved.

Unique Password

With most encrypting, each file can be made secure by use of a unique password. Even people with access to the programs that use the file can't decipher it unless they have the password used with that file when it was created.

Of course, passwords present problems to both the legitimate and the illegal user. Neither can access the data on the file without the precise password that was used to encode it. The unauthorized user has to find the password; the authorized user must not forget it.

If a program uses more than one file, each may be processed through a separate copy of the enciphering module, controlled by its own password, to prevent illegitimate users from accessing more than one file if they do in fact find one of the passwords. This technique adds little to the work required by the programmer or operator, while adding considerably to the security of the data.

Separate I/O Modules

There are more severe difficulties in trying to set up separate modules for the input and output processing of each file, with the idea of changing passwords from cycle to cycle, especially for non-sequential disk files.

All records on a tape or sequential disk file pass through the CPU even if they are not subject to any application processing per se. Since all are accessed, all can be deciphered into clear text with one module and its password, then enciphered again with another password. Even if someone got the key for one cycle, he would not be able to use it to steal data from a different cycle.

With random or direct disk applications, however, not all records are accessed each cycle and it appears effectively impossible to change passwords on these files. A code would have to be added to each record to indicate which cycle created it, and logic would be needed to access the proper password efficiently.

Endless List

This would entail maintenance, within the computer, of an endless list of passwords and the cycles on which they are used. The search and retrieval logic would be complicated by the open-ended nature of the list.

Beyond that, however, once the match-up is done by the machine without operator intervention, the system is open to anyone and security is gone.

Most encrypting routines can handle any type of data, the vendors claim, in any coding structure, and there is no limit to the size of records or file organization being protected.

Character Restrictions

A very real restriction on the use of encrypting lies in the inability of some CPUs or other equipment to accept all the characters that may be generated by the encoding routine. Some communications gear, for example, reserve certain codes as control characters.

The enciphering software is generally distributed as a self-contained module, and the CALL statement of high level languages is used to access the coding and to specify how the operator is to enter the password. Macro instructions with similar "hooks" for the operator interface are available for Assembler language programs.

Same Module Used

Usually the same module is used for both enciphering and deciphering, which are logically a single function, one being the reverse operation of the other.

Several of the modules are based on polyalphabetical substitution with randomly chosen alphabets. Each character of text is ciphered with a different alphabet, and these are never repeated. This means a different, randomly chosen coding structure is used for each byte of data.

The quality of the particular enciphering routine, then, depends on the quality and uniqueness of its random number generator. At least one vendor makes changes in each copy of his routine so that no two routines cipher exactly the same way, even if presented with the same password.

Partial Ciphering

Encrypting adds very little time to the processing for which an application program was designed. One vendor has estimated his routine can process about 23,000 80-character record/min on a 360/30. He noted there is no need to cipher the entire record, if only certain fields contain sensitive data. Partial ciphering would speed the processing time, he added.

The routines apparently do not require much storage either. One package uses only 500 bytes for the coding and an additional 880 bytes of working storage.

COMMUNICATIONS

Data Briefs

Sanders Has RJE Package Using IBM's OS Hasp

NASHUA, N.H. – Sanders Data Systerms Inc. has added a remote job entry (RJE) software package to its Can-Do 804 intelligent terminal.

The package, available free to 804 users, enables the terminal to emulate an IBM 2780 system when used with 360/370 CPUs.

Based on IBM's OS Hasp, Version III, the Sanders package will allow remote entry of punched card data using on-line communications facilities. The package allows 804 users to transmit Ascii in point-to-point nets at 2,000/2,400 bit/sec with terminal identification options.

The RJE Sanders 804 terminal system includes a CRT, card reader, printer and required communications interfaces. The system is designed to replace the IBM 2780 Model 1 terminal. The 804 costs $14,105 or $640/mo. Sanders is at Daniel Webster Highway S., 03060.

Codex Pushes Dial-Up Modem

NEWTON, Mass. – Codex Corp. has introduced a dial-up version of its 4,800 bit/sec modem.

The unit has a 40-msec turnaround time in half-duplex mode and includes an equalization time of 140 msec, the company said. Built-in diagnostics include a test pattern generator, local and remote loopback capability and a line condition monitor.

The modem costs $5,575 or $150/mo with first delivery scheduled for this month. Codex is at 15 Riverdale Ave.,

Speech-Plus Terminal Ready

NORWALK, Conn. – General Datacomm Industries has introduced its 1300 Series speech-plus terminal which allows both voice and data channels to be carried on one private voice-grade phone line.

The 1300 includes a speech-plus filter, telephone adapter, FDM interface and data channels. The $7,990 basic system is available in 60 days from 537 Newtown Ave., 06851.

ICA to Meet in Boston

PITTSBURGH – The International Communications Association (ICA) will hold its 1973 annual conference in Boston, May 13-17. The theme of the meeting will be "Telecommunications – The Lifeline on the Business World."

More than 500 ICA members are expected to attend and more than 100 vendors are expected to exhibit their equipment.

Information regarding the conference is available from J.D. Martin, manager of communications systems, National Steel Corp., 700 Chatham Center, 15219.

Few Taps Reported

Phone Lines Prone to Compromise

By Ronald A. Frank
Of the CW Staff

While there are few actual instances of stolen data, there is no doubt that equipment vendors, common carriers and customers are concerned about the problem. The big question mark lies in the unreported cases where equipment and/or data is illegally accessed or compromised. No one knows the extent of such incidents. But many companies which transmit data now feel that increased protection makes sense.

As the carrier of the data, the telephone company is especially concerned about unauthorized access to its facilities.

"Telephone company operating personnel don't give out information that might in any way help to gain entry into telephone facilities," an AT&T spokesman said.

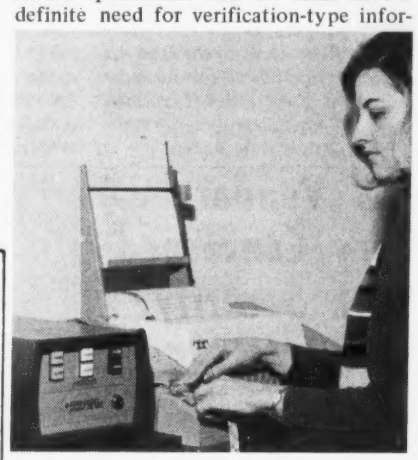
Recent articles have claimed it is possible for unauthorized persons to access

Spotlight On Security

lines used by time-share vendors by going through telephone company verification trunks. These lines are normally used by the phone company when trouble is suspected on a line.

At a customer's request, an operator can monitor a line to determine its status, but the access to the line is restricted to the operator, the AT&T spokesman said.

The person requesting access to a verification trunk must be more than an employee of the phone company, the AT&T spokesman said. He must have a definite need for verification-type information. While Bell will not document, the specific methods used to access the verification trunks, the company does emphasize that such accesses are limited and carefully controlled.



Encrypting unit secures TTY data.

"We also apply protection techniques to terminal boxes, local loop lines and other facilities installed at customer locations," an AT&T spokesman said. In large buildings, this type of equipment usually is installed in secure locations with limited availability to outsiders, the spokesman said.

Another practice within the telephone company, called "service observing," has no impact on data users, the spokesman

(Continued on Page 20)

Two Digital Modem Equivalents Will Operate on Bell DDS Net

NEW YORK – When AT&T's Digital Data Systems (DDS) begins operating in 1974, two units will replace much of the communications equipment now required by data users.

Instead of transmitting data over analog facilities which require the familiar modems now used, the customer will have either a Data Service Unit (DSU) or a Channel Service Unit (CSU).

The DSU will accept standard CPU signals and convert them to signals suitable for transmission over the 4-wire local loop that will be required between the subscriber's site and the local DDS central office, according to AT&T specifications.

The local loop will utilize a bipolar

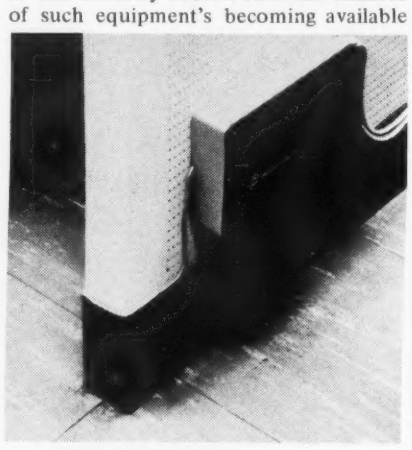
DSU translates DDS Signals

signal in which a one is represented by a pulse and a zero is represented by the absence of a pulse. The polarity of the pulses will alternate so that a string of pulses would appear on the local loop as alternating positive and negative pulses.

In addition to this format conversion, the DSU will terminate and equalize the loop and provide for testing of the digital channel, according to AT&T.

For users who may want to install non-carrier equipment on the DDS, the CSU will provide only the circuitry necessary to provide for "properly balanced and equalized terminations of the [local] loop" and it will allow for rapid remote testing of the loop, according to AT&T. Customers who have the CSU will have to perform the necessary signal processing to and from the bipolar line format, according to AT&T. In addition, the user will be responsible for timing recovery and logic functions within his non-carrier equipment.

At present, there are no digital modem equivalents that could interface with a CSU to handle bipolar signals, according to one industry source. And the chances of such equipment's becoming available



Bell CSU on Office Partition

are still problematical, he said.

Bell has proposed an "illustrative rate" of $15/mo for the DSU. It is questionable whether independent equipment could be supplied to the user to interface with the CSU that would be within this price range, the source said.

But the rates proposed by AT&T for the DSU have yet to be approved by the Federal Communications Commission. The bipolar signal transmissions will apply only to DDS private line facilities. Dial-up lines will still require the use of conventional data sets as well as non-DDS private lines.

Passbook Data Read From Magnetic Strip

TRUMBULL, Conn. – Bunker Ramo has added a magnetic strip feature to its Universal Teller Terminal that reportedly will save tellers 66% of the keystrokes normally required to post a transaction.

Using an Automatic Account Number Pickup (AANP), the 2001 terminal can read the account number and balance from a strip of magnetic tape affixed to the back of the passbook. The account information is transmitted to the CPU from the on-line terminal.

New or existing bank passbooks can be equipped with the magnetic tape strip which costs one cent each, Bunker Ramo said.

The 2001 terminal includes a CRT, printer, keyboard and communications controller. It is scheduled for first delivery in the second quarter of 1973. The firm is at 35 Nutmeg Drive, 06609.

Bell DP Projects Can Help Subscribers in Many Ways

By a CW Staff Writer

NEWTON, Mass. – A "minicomputer task force," a centralized programming development group and other computerized operations are helping the Bell System optimize its role as a DP user.

Current Bell DP projects are described in an article titled "Making the Most of the Machine," in the current issue of *Bell Telephone Magazine*, an AT&T publication.

One effort that could lead to better service for telephone subscribers is the Carrier Transmission Maintenance System (CTMS), the article stated.

The system includes a computer-controlled maintenance center that can take "10 measurements per second" of installed carrier equipment. Field trials have been held in New Jersey and Georgia, and the first regular installation is scheduled for next year, the article said.

One system, Carta, monitors all calls routed to a tone or an announcement "for reasons other than overload," the article said. A "central analysis bureau" in San Francisco will soon include a minicomputer to control the trouble reports being generated by 37 statewide teletypewriters.

The Carta system will allow the TTYs to print out trouble and repair work patterns as one step in "automating the whole repair cycle," the article said.

AT&T Long Lines maintains a central DP site in Cleveland, the article said, to analyze trouble reports from the operating companies in the Bell System. Called Network Operator Trouble Information System (Notis), switchboard operators at automated positions can press "four keys in sequence" and initiate a TTY report that is sent to the Cleveland center.

In the future the Cleveland center will probably concentrate on "intercompany data" with individual companies doing their own analyses, the article said.

One problem with an organization the size of the Bell System is that programs must be developed to run equally well by different machines, the article said.

Joint effort task forces with representatives from Bell Labs, AT&T and the operating companies develop the programs. Such a group including programmers, engineers, economists and others may work up to a year to develop a program, the article said. When finally debugged, the program is sent to Western Electric where it is processed and documented for use throughout the Bell System.

A minicomputer task force is charged with finding ways to integrate the dedicated CPUs into phone operations. One application being developed includes the remote surveillance of microwave relay stations using telemetry signals.

The telemetry signals continuously monitor the status of the remote microwave sites in addition to calling out alarm conditions. The minis compile the telemetry data, analyze alarm patterns and print out status reports, the article said.

T/S Vendors Very Concerned With Security

(Continued from Page 19)

said. While an operator might randomly access a line being used to transmit data, this would not affect the transmission, the spokesman said.

Such an interruption would not affect the data stream in any way. It would be done "simply to hear that the line is working," the spokesman said.

While the telephone company does not take any special measures to protect lines used by time-share vendors, all private line facilities do "get more attention" than dial-up lines, the spokesman said. These circuits would be less prone to interruption than lines used by other subscribers.

One company very much concerned with the possibility of compromising data is Datotek Inc. The firm supplies encrypting devices for commercial and government users.

Proprietary data that should not be made available outside of a company should be treated as part of a firm's assets, according to George Goode, Datotek's chairman of the board.

These assets, in the form of data, could be stolen from the user without his knowledge.

While Datotek admitted there is little hard proof of lines being tapped, and data being compromised, the firm also said there is no way to guard, and absolutely secure, data being transmitted over the phone network.

One industry observer sees little problem in installing a miniature transmitter on a data line to transmit data to a receiver "a block away" where the information can be recorded for later analysis. The AT&T spokesman said Bell allows wiretapping only in cases where it is ordered by a court. And even then the local phone company will want ironclad documentation and assurances before allowing access to its facilities.

While Datotek will not supply detailed information about its business users, the company will say they include some of the largest industry leaders within the country.

For a company with one circuit between two points, it could purchase encoders at each end of its data link for about $125/mo or $250/mo for both ends, Goode estimated. And this figure is much less than the value of the information that could be compromised, he added.

T/S Vendors Stress Security of Terminal, Net, CPU

By Ronald A. Frank
Of the CW Staff

Data security is a matter of continuing concern for the time-sharing customer and vendor. The firms which supply T/S facilities are constantly reevaluating their security systems.

While host users fall short of encrypting all their data, elaborate measures are implemented by all vendors to protect the user's information.

The T/S security problem breaks down into three areas, according to a communications expert for one company. Safeguards can be applied to the terminal, to the network or at the CPU, he said.

Of the three, the terminal at the user's site has probably had the fewest safeguards built into it. While a key can of course be

Spotlight On Security

used to prevent activation of the terminal by unauthorized users, few other terminal-oriented security measures have been implemented by the T/S vendors.

It is true that some passwords are generated on teletypewriters using control characters not printed out, but these are not considered to be security measures but rather efficient terminal usage.

"Intelligent terminals with built-in encryption devices are getting very little attention," according to one T/S spokesman.

Such devices could be used to encode data using random thumbwheel-selected encryption patterns, the spokesman said. And this data could then be decoded either by a similar device at the T/S CPU or through software routines, but these methods are still considered extreme by most T/S users. One vendor said his company is currently evaluating an encrypting device but so far the unit has drawn little interest from the firm's customers.

In the area of network or transmission security the picture is less clear. Most T/S firms acknowledge the most insecure portion of the customer/vendor link is in the local loop between the customer's premises and the central telephone offices.

While many admit a determined individual could tap a data line, attach a modem and demodulate the signal, they add that any data acquired in this manner would be of questionable value. Even if it were possible to install a modem, and record the data for later analysis, the resulting data would probably be only a "small slice" of what was being sent by the user, they add.

Much of the data being transmitted by the customer includes "software safe" information without actually being encrypted. For example, many of the access schemes used by T/S users are entirely under the customer's control. "If the customer loses the password that he has originated, there is no way we can help him retrieve his data," one vendor said.

The most vulnerable area for data compromise is in the CPU/software area. But here the T/S companies have done the most in protecting the user. While it may be possible to steal a password and access a file, it would not take long for the user to find out.

Most vendors supply their customers with detailed printouts listing where, when and by what method their data bases were accessed. If a password were stolen, the user would know after one incident that his data had been accessed.

Related security measures limit those accessing data bases to a preset timed access interval or require a whole hierarchy of passwords that would make knowledge of one portion of the access method ineffective.

The most sensitive data for most customers includes accounting information. In this category are salary statistics, sales figures and inventory levels. But this data is usually not stored at T/S networks.

Another sensitive area is the system software which is written by the T/S vendor to control and operate his services. Here many vendors use a staff of programmers to develop pieces of the overall software. Only a few individuals within the vendor's organization can access the entire system programs which would be required for unauthorized access into a customer's data base.

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Bits & Pieces

Storage Capacity for 360/65 Doubles With Add-On Memory

CONCORD, Mass. – An add-on and replacement main memory that can double the storage capacity of 360/65 computers is available from Cambridge Memories, Inc.

The new memory – called 360/core 65 – can be attached to the 360/65 processor in sizes ranging from 262K bytes up to 2M byte, a spokesman stated.

Conventional IBM-supplied memory for the 65 is limited to 1M byte, he continued.

Prices start at $84,000 purchase for the 262K-byte unit, with a monthly lease price of $2,683 for a three-year lease. A 1M-byte system costs $215,000, or $6,868/mo on a three-year lease.

These prices represent about a 50% saving below IBM's price, the firm stated.

All deliveries are from 696 Virginia Road, 01742.

PDP-15 Users Get Disk Controller

IRVINE, Calif. – PDP-15 users have a disk controller from Telefile Computer Products to allow them to interface IBM 3211- and 2314-compatible disk drives to their systems.

The DC-18 connects to the PDP-15 single-cycle I/O channel and controls up to eight disk drives. Features include simultaneous seek operations, verification of track location, error checking of all data transfers, monitoring of many substation status conditions, low core requirements for software, read or write multiple records with a single command and direct transfer to or from memory for data.

Delivery is from production, requiring approximately 60 days. Prices start at $15,000 depending on quantity and options from 17785 Sky Park Circle, 92664.

Philips Reader Adds Capability

NEW YORK, N.Y. – Philips Business Systems has introduced an automatic magnetic ledger card reader to provide increased productivity for its P-350 series of office computers. The P-130 card reader extracts information from magnetic storage stripes at the rate of 65 card/min, and relays the encoded data to the computer for instant printout.

Up to 750 magnetic ledger cards can be loaded into the P-130 hopper and the automatic reader sorts and selects cards as determined by the program, with a selective printout if required. Cards are stacked after reading in the same sequence. Damaged or unreadable ledger cards are not accepted by the machine.

Leases for the Philips P-130 start at $145/mo from Philips Business Systems Inc., 100 E. 42nd St., 10017.

Undercutting the Mini?

Programmable Calculator Uses Basic

By Michael Weinstein
Of the CW Staff

PALO ALTO, Calif. – Hewlett-Packard's new desktop calculator appears more computer than calculator.

Designed for the small user who neither needs nor wants a multi-language capability, the Model 9830A uses a comprehensive version of Basic.

Hardwired into the "programmable calculator," the 15K-word microcoded interpreter allows small users to perform mathematical and business applications.

A further advantage of building the operating system into the machine is that all memory space is left free for use as work area, a spokesman stated.

The potential drawback of this approach is that the instruction set for the user may limit the types of applications he can perform.

The HP machine does provide a large instruction set of both mathematical and string manipulation commands. The user can also use a function statement to define complex operations which can later be called into the main program by entering the user-specified function designator, he continued.

Another potential problem area HP avoids is the possibility of too little memory for meaningful programs, the spokesman added. The 9830A system uses a built-in cassette subsystem that can store on-line 80K bytes of data or program instructions.

Using a bidirectional search capability, programs in execution can access data directly from tape, the spokesman stated.

For example, a user could place subroutines on the cassette, and when the main program needed to branch, these could be brought into main memory only for the period of time needed.

On-line editing is accomplished with a small display screen that can be used to show the contents of any specified line.

As with statements, all editing commands are hardwired into the unit and operated from editing keys that allow the user to delete, modify or change individual characters within a displayed line.

Error diagnostics are in the form of a code – e.g., error 3 – which appears on the display screen. A pullout card attached to the unit directs the user as to the meaning of each code.

In addition to the initial built-in cassette, up to nine outside cassettes can be accessed from the 9830A, the firm stated. The cassettes give the user read/write capability so that when used with the editor users can read a file – from cassette to main memory – modify it and return it to storage, the firm noted.

The unit comes with a basic 4K bytes of read/write memory expandable to 8K bytes. Add-on read-only memory (ROM) can be added in 2K-byte increments for a total of 16K bytes.

The ROM units contain logic for special applications. For example, one 2K-byte unit adds matrix operation facilities to the user. Others add string capabilities or are used to allow the 9830A to interface with outside peripherals – e.g., using the plotter control ROM users can access an X-Y plotter for preparing graphs, curves, etc.

Calculator interfaces to printer, plotter and card reader.

Up to 13 different types of peripherals can be slaved to the central unit in this manner.

The suggested initial unit for the system is a thermal printing unit for producing hard copy at a rate of 330 char./sec on a 5 by 7 dot matrix.

The price for the 9830A calculator is $5,975. Optional memory is $1,475 with add-on ROMs costing $485 each. The 9866A Thermal Printer costs $2,975. All deliveries will be in the first quarter of 1973 from 1501 Mill Road, 94304.

Users Lax About Hardware Changes

Spotlight On Security

Data security may be a pressing social issue and DP managers may attend meetings explaining the dangers of data compromise during transmission, but users are not pounding on manufacturers' doors demanding more security-oriented hardware.

As long as data processing remains within the computer room, there is little need for expensive security systems, a spokesman for one manufacturer stated.

Users operating single-site installations – the vast majority – need only watch whom they hire and have a good lock on the door, he continued.

Remote Access Brings Need

Not until more users start remotely accessing their computer will there be any increased demand for hardware security, he stressed.

IBM in adding virtual memory to the 370 series has taken the user in this direction by allowing remote users to simultaneously access the same machine.

While the capability to allow multi-user remote access has been accompanied by a renewed interest in security by IBM, most security efforts have been in either software or communications. Hardware changes appear to be made only when necessary to support the software need.

Types of security applications that require some hardware design within the CPU come from privileged instructions and storage protection, according to IBM.

Privileged instruction hardware controls the use of instructions concerned with the allocation of main storage and control of I/O processing so they are used from the supervisory state.

Hardware can also be used to help prevent programs operating in problem conditions from performing I/O or allocating areas of storage defined as confidential.

Storage protection includes providing each user and each block of main storage with a code to access these regions.

Terminals are much more a concern because the user at the terminal is anonymous.

The whole effort of terminal design must be to identify the person using the terminal and stop passersby from seeing sensitive output, one mainframe spokesman stated.

Techniques used include "print inhibit" – allowing the user to enter data without it's being physically displayed; security keylocks – which freeze the keyboard so that no data can be entered without a proper card or badge; and a terminal identifier so DP personnel can determine what terminal is connected.

Keeping with the idea that data is secure while being processed but potentially in danger when being transmitted, another hardware area of concern is direct access devices.

File masks can be used to control the types of commands which can be executed – e.g., write or seek commands could be disallowed.

Volume detection can be used to alert the control program when a volume is mounted so an operator cannot inadvertently switch volumes unknown to the control program.

Finally, a toggle switch for each drive can protect data volumes from being written upon.

Who Accesses What on Remote Terminal? DP Managers Must Have Stricter Control

By Michael Weinstein
of the CW Staff

As more users configure their systems to permit on-line information access they will have to exercise stricter control over who can use remote terminals and what information can be accessed.

Potential problems range from preventing the curious from browsing through personnel salary reports, customer lists, and operating statements to preventing the malicious from altering payroll records, obtaining secret financial information and illegally viewing specifications of new products.

Safeguarding the access to sensitive information is the responsibility of the DP manager who must insure that his system can identify authorized users.

Either the terminal, the person or the program attempting to access data must be identified so the right to use the system can be verified.

In a large commercial bank where all tellers are allowed to access customer balance sheets to verify and update accounts, all that is necessary is to locate the terminal so only bank tellers can use it and make sure the computer knows the address of this terminal.

The computer must be able to determine the address of each terminal with which it communicates. It must be able to poll any terminal for its specific address. Even with a general poll – to which any terminal on the communications line can respond – the computer must still be able to identify privileged terminals by having the terminal address precede each input or output.

The DP manager should determine which terminals are in fact at secure locations. Those terminals not secure should not be given data access.

Switching Terminals

Care must be taken since with certain line configurations it is possible – and often desirable for backup – to switch the addresses of terminals. For example, if a terminal breaks down, users might have to use another terminal until the first is fixed. This can cause the system to falsely identify a terminal as secure.

To avoid this, terminals should be equipped with special features to respond to computer-generated queries with unique identification codes.

The minus side of positive terminal identification is that a terminal failure cannot be easily resolved. An authorized person must call the computer center and direct the switching of privileges from the downed terminal to another unit. The center must make the necessary changes.

This impacts system availability and is one reason why most installations place primary reliance on user identification rather than identification of terminal and location.

Further, if only one or two individuals within an area can access certain information, it is necessary to devise a means of identifying the user above and beyond what terminal he uses.

There are basically three ways to identify a user:

- By something that he alone knows or memorizes, such as a password or answers to prearranged questions. This technique requires no special hardware and is reasonably secure.
- By something he carries, such as a badge, card or key.
- By a personal physical characteristic. This might be the user's voice, which, when transmitted to the computer, is compared with a stored "voice print" for identification. This technique is used in government security, but because of cost is not commercially available.

Spotlight On Security

Password Most Common

Of the three, the password is the most commonly accepted method. In its most general form, a user enters the system by identifying himself with a user ID typed in at the terminal. The computer system compares his entry to a table of authorized user IDs who can access information.

If the user ID is correct, the system asks him for a secret password. The user then enters the secret word.

If the password is correct, the system allows that user access to all files for which he is cleared. Before any file can be read it must be listed as accessible from that user ID.

To increase security, some files can be designated as read only.

The obvious danger is that a password might fall into the hands of an unauthorized person. For this reason passwords should be changed regularly.

On some systems, new passwords are issued monthly. The new word is conveyed to the user on an otherwise blank card so even if this is lost there is little chance of relating the password to the proper user ID.

In systems such as banking and airline reservations – where more people have access to greater amounts of information – badges in conjunction with passwords have been used.

Since the user must have his key or badge to operate the system, he is more likely to report it if lost. If the system also incorporates a password, there is little chance of a person who finds a lost badge being able to use it.

A problem common to password and question and answer security is the exposure of passwords to casual observers if the terminal prints everything. Features to inhibit selected printing or display can be provided on some terminals to eliminate this problem.

Another problem can result when an authorized user leaves the terminal connected to the system when he is through. It is possible to resolve this by programming the computer to automatically drop any terminal that has not transmitted for a specified time.

Unattended terminal problems can occur when a user requests an extensive computation or file search and leaves the terminal located while the operation is performed. When information is ready, the system should reconfirm the user's identity before transmission.

DP personnel must balance the needs for terminal security against the possibility of becoming too time- and memory-consuming.

As new uses of the system are added, the basic identification philosophy should be reviewed.

The final concern must be for the logic routines and stored tables that determine who can access what. Who needs to steal a password if he can see the entire table of passwords and what each password can access?

All testing, additions, changes and deletions to these data sets should be tightly restricted and controlled by the DP manager.

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Retailers 'Married' to POS Terminals Appear Happy

By Don Leavitt
Of the CW Staff

Point-of-sale terminal systems are among the hottest items in the retailing input spectrum. For the retailer big enough to justify their use, the systems promise all sorts of planning, management and control functions – all essentially derived as byproducts of the basic operations sales clerks must do anyway. In some configurations, they make life easier for the clerk, and for the customer as well.

Insight into the potential for broader use of POS-like concepts was provided in a recent study of the terminals used in the systems, published by Gambit Management Strategies Inc., a New York-based market research firm.

The units can operate not only on the sales floor, the report said, but on the shipping dock, the warehouse and the business's back office.

Workers at the dock can record the transfer of merchandise to truckers or individual customers, or the return of merchandise to the vendor, Gambit noted.

In the office, Gambit sees the units reading merchandise tags, entering basic data such as payroll information for later processing or reading information from accounting documents such as purchase orders or invoices.

With that much apparent potential, it's hard to see how POS terminals differ from general-purpose "intelligent" terminals.

They do, of course, have a great deal more flexibility than some "source data automation" devices, particularly some of the earlier ones that could handle only one type of input medium, and often just one type of transaction recorded on that medium.

The major difference between the general-purpose and the POS terminal is that the latter is built for a specific purpose.

Though the purpose may differ depending on where it is used, it is essentially a turnkey device.

The designers have sacrificed the ability to cope with a range of possibly unrelated applications – that could be changed without requiring changes in the terminal itself – to cope with one or a few well-defined jobs very efficiently.

The terminal systems differ in detail from vendor to vendor, but basically they allow the sales clerk to enter sales transactions on what looks like a jazzed-up conventional cash register. It may even have cash drawers for cash sales.

The goal of most units is to keep the clerk's effort to a minimum, while still collecting more information, faster and more accurately than was possible with the older registers. Accuracy and speed appear contradictory to the need to process more data, Gambit admitted, adding that to accomplish these results a more competent sales person should be required to operate the register.

This need for better workers, at higher wages, is one of the factors retarding the growth of POS in its "natural" retailing environment, the report said. Obviously the same problem could delay the implementation of POS-type systems in other situations.

Though operating a POS terminal requires more brains than ringing up a sale on an old-fashioned register, it is generally no more complicated than filling out a charge sales slip with its myriad of carefully captioned boxes.

When the POS clerk keys in a transaction code, to let the system know what is coming, the terminal "console" may coach him through the operation step-by-step, and various peripheral devices may be available to pick up data from the sales tag or other basic sources, so the clerk doesn't have to enter everything himself.

But most of the systems don't run through this sequence blindly. Edit routines, tailored to the particular application, check the validity of the clerk's response to the current instruction before they let him go on to the next step. An entry that is unacceptable is simply not accepted and the clerk is told, in effect, to try again.

But keying can be valid without being accurate. An entry may fall within an acceptable range, but in fact be the wrong value for the actual situation. This is where the smart peripherals, feeding data directly into the CPU, come into play.

Light pens that can scan Kimball-coded clothes tickets; mark-sensing devices; and magnetic stripe-card readers are all designed to pick up data without depending on the accuracy of the operator.

Beyond that, of course, the magnetic striping, if it comes on the back of a customer's credit card, may serve in itself to authorize the purchase, or to interact with the system's credit authorization application and speed that whole process.

Once everything is entered at the operator's terminal, the CPU in effect "knows" it has good, current data that can be massaged any way the user wishes.

In the retail situation, which clearly is adaptable to other user needs, the data may be copied right back out to a terminal printer to produce a sales slip of the just-recorded transaction.

This capability may include a translation of merchandise codes into full English language descriptions so the customer will know what transaction the slip covered, when he finds it unexpectedly at the end of the week. In any case, it saves the clerk from scribbling out a slip that the customer won't be able to read anyway.

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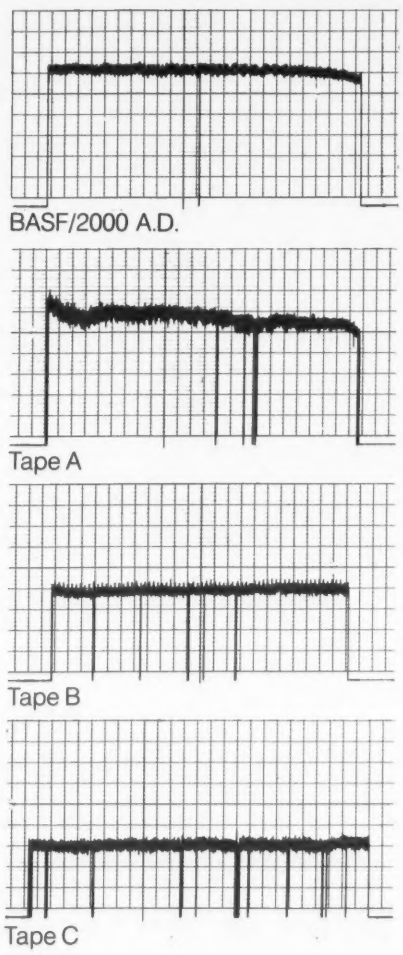

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Batch-Oriented, CAI-Like 'Asag' Teaches Fortran

EAST LANSING, Mich. – A software system that is, in effect, a batch-oriented computer-assisted instruction (CAI) program was used last year to teach Fortran to engineering students at Michigan State University.

With some modification, the Assignment Scheduler, Analyzer and Generator (Asag) system should be useful in teaching any subject that has definitive rules and requires students to come to rather limited conclusions, according to the system's developer, assistant professor Leonard H. Weiner of the computer science department.

In its present implementation, Asag is linked to the normal Fortran compiler installed on the university's CDC 6500. It generates a separate assignment for each class member and monitors how well the assignment is done before making up the next task for that student.

Education

This approach requires the student to develop a complete plan of logic and coding and to have his instructions keypunched before they are included in the batched compiler run. More conventional CAI systems are interactive, allowing the student to piece together his logic as he goes.

The system is described as a progressive tutorial approach to teaching. Initially it generates assignments that are essentially the same for each student. The numeric values are different from student to student, and Weiner has no control over these values since they are the product of a random number generator within Asag.

Asag compares what the student submits for compilation to what it anticipated as the proper response. It notes any diagnostics from the compiler but, if possible, continues the compilation so that all errors can be identified in a single pass.

Programs Executed

If the compiling goes well, the system creates test data and executes the program. Thus the student gets back as complete a package of results as the system can provide.

In addition, Asag scores the student's work and determines whether the next assignment should be easier, harder or of the same degree of difficulty. Repeated indications of weakness in a given area will cause Asag to assign the student extra practice in that type of work.

Daily and weekly box scores are kept on each student's work and results are given to both the instructor and the student.

Two Terms in One

Asag appears to be effective as a teaching tool. During last year's winter and spring terms, Weiner used it in two classes with approximately 600 students in total. Ten percent of the students worked ahead into the next course, and one actually completed two terms' work in one term.

Weiner is currently seeking funds to use the system again next spring, and to determine how well it can be adapted to other disciplines.

Asag itself doesn't really teach

(Continued on Page 29)

Free Conference To Study Uses, Support of APL

GREENBELT, Md. – Users and potential users of APL will be able to compare notes with computer manufacturers, time-sharing service companies and terminal makers at a free three-day conference planned for next March by Goddard Space Flight Center.

"We will provide an intellectually stimulating environment for those who are steeped in APL and, at the same time, offer introductory tutorials for those who want to learn what APL is all about," according to conference chairman, Cyrus J. Creveling. The only thing in common among the participants will be an interest in APL, he added.

Papers are invited in a range of topics. Implementers need to know how their systems are being used and the users need to learn about new developments. The users need to talk to each other to learn of applications in which the interactive capabilities of APL have been particularly effective, Creveling noted.

New APL implementations on a variety of CPUs, he said, include improvements in processing efficiency, file subsystems, input/output, faster terminals, graphics support, time-sharing services and new functions within the language itself.

Business Uses

Papers are expected to cover both business and scientific applications, APL enhancements, comparisons with other programming languages, and uses of APL in education. Otherwise, authors are expected to describe techniques of teaching APL, APL's impact on management and recommendations for future developments.

The conference, scheduled for March 12-14, 1973, will be the third conference on APL to be sponsored by the National Aeronautics and Space Administration (Nasa) facility since it began working with APL in 1966, Creveling said.

Although there will be no fee, the chairman has asked anyone interested in coming to the meeting or in submitting papers to contact him in care of Code 560, at the space flight center, 20771.

Sixth Edition of Bibliography Covers 1,000 Titles

More than 200 computer books were published this year. The University of Colorado's sixth edition of the *Annual Bibliography of Computer Books* now contains more than 1,000 entries and will be available at the end of this month.

J. Daniel Couger On Education

I'm on the automatic distribution lists of 123 publishers. One of my most interesting tasks each year is reading new books while cataloging them for the bibliography.

Each book is reviewed and categorized according to type (text, reference or handbook) and style of presentation (programmed instruction, case method, readings, or narrative).

Major Gaps Filled

This year's books fill some important gaps in the existing literature. For example, there has been a scarcity of books on the application of computers in planning. Three new books were published on this subject, including the excellent *Online Planning*, edited by Sackman and Citrenbaum.

Unfortunately, books continue to be published which pay lip service to the applicability of computers in various disciplines. An example is the third edition of Baumol's widely used *Economic Theory and Operations Analysis.* Instead of integrating the computer content throughout the book, as appropriate to each subject area, he merely adds a "Postscript on Computers."

In contrast, Plane and Kuchenberger have integrated computer solution techniques with each topic in their new *Operations Research for Managerial Decisions.*

60 Programming Books

Programming books continue to proliferate. Of the 60 new books devoted to languages, 21 were on Fortran. The overall bibliography now lists 52 Fortran books. Better we should have more APL books; only two were published this year.

There is some improvement in the programming literature, however. Fifteen books were published in the advanced programming category, including such excellent additions as Donovan's *Systems Programming* and Katzan's *Computer Organization and the System/370.*

The previous gap in the literature for systems analysis and design was plugged with the addition of 28 new books, including *On Purposeful Systems*, by Ackoff and Emery.

Applications Books

Thirty-two books were published in the applications area including seven in the behavioral and social sciences, three in accounting, three in decision theory, four in production, two in marketing, six in simulation and two in personnel management.

The bibliography now lists 24 books on subjects related to managing data processing installations. Two new books are Withington's *Organization of the Data Processing Function* and Van Tassel's *Computer Security Management.*

The section on reference books for the department library had six additions, including the second edition of the *Directory of Data Processing Education.*

Bibliography Restructured

The bibliography has been restructured for quicker referencing, and it now contains 15 major classifications and 45 subclassifications.

Copies of the bibliography are available for $3 from *Computing Newsletter*, University of Colorado, Cragmor Road, Colorado Springs, Colo. 80907.

Couger is professor of computer and management science at the University of Colorado. He edits the Computing Newsletter for Schools of Business, published by the university.

'Asag' Teaches In Batch Mode

(Continued from Page 28)

or grade the students, Weiner noted; it merely generates variations of assignments originally written by the instructor, checks the students' work and reports the results. How well an institution utilizes this tool is up to the institution itself, he added.

Cost of using Asag is substantially less than using a conventional interactive CAI system. Weiner estimates that last year's operation cost only 98 cents per student, for time on the computer.

UCLA Short Course Covers Measurement

LOS ANGELES – Computer System Measurement Techniques will be the subject of a short course to be offered by the engineering extension office of UCLA late next winter.

Open to anyone with experience in designing, programming or operating DP systems, the course will run from Feb. 26 through March 2, 1973.

Other short courses planned for the winter and spring include Analysis of Random Data Using Digital Time Series Techniques (Feb. 5-9) and an Introduction to Optimization Methods (March 26-30) related to mathematical programming.

The UCLA Extension Office is at 10995 LeConte Ave., 90024.

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Listing of General Interest DP Societies Compiled

The computer societies are having their biggest week of the year, as the Fall Joint Computer Conference takes place in Anaheim, Calif.

But only about one-third of the active societies are actually constituents of the American Federation of Information Processing Societies (Afips), which sponsors the national shows.

Computerworld has compiled a listing of representative, general-interest DP societies, and only those with national memberships have been listed.

Trade groups of vendors, and groups which require using certain manufacturers' equipment have also been precluded.

Afips members are listed in bold-face type.

■ **American Institute of Aeronautics and Astronautics (AIAA)**, 1290 Avenue of the Americas, New York, N.Y. 10019

■ **American Institute of Certified Public Accountants (AICPA)**, 666 Fifth Ave., New York, N.Y. 10019

■ American Society for Cybernetics (ASC), 7700 Old Spring House Road, McLean, Va. 22101

■ **American Society for Information Science (ASIS)**, Suite 804, 1140 Conn. Ave. N.W., Wash., D.C. 20036

■ **American Statistical Association (ASA)**, 806 15th St. N.W., Wash., D.C. 20005

■ **Association for Computational Linguistics (ACL)**, 1717 Mass. Ave. N.W., Wash., D.C. 20036

Societies/ User Groups

■ **Association for Computing Machinery, Inc. (ACM)**, 1133 Avenue of the Americas, New York, N.Y. 10036

■ Association for Development of Instructional Systems (ADIS), Box 1403, Los Gatos, Calif. 95030

■ **Association for Educational Data Systems (AEDS)**, 1201 16th St. N.W., Wash., D.C. 20036

■ Association for Systems Management (ASM), 24587 Bagley Road, Cleveland, Ohio 44138

■ Association of Computer Programmers and Analysts (ACPA), P.O. Box 95, Kensington, Mo. 20795

■ Biomedical Computing Society (BCS), 5333 Westbard Ave., Bethesda, Md. 20014

■ Communications Systems Management Association (SCMA), West 1102 St., Suite 1001, Wilmington, Del.

■ Computer Lawyers Group (CLG), 28 State St., Suite 2200, Boston, Mass. 02109

■ Data Processing Management Association (DPMA), 505 Busse Hwy., Park Ridge, Ill. 60068

■ Geoscience Information Society (GIS), 5775 Viking Drive, Beaumont, Texas 77706

■ Graphic Communications Computer Association (GCCA), 1730 N. Lynn St., Arlington, Va. 22209

■ International Communications Association (ICA), Box 1010, Athens, Ohio 45701

■ **Institute of Electrical and Electronics Engineers, Inc. (IEEE) Computer Society**, 738 Whitaker Terrace, Silver Spring, Md. 20901

■ **Instrument Society of America (ISA)**, 400 Stanwix St., Pittsburgh, Pa. 15222

■ International Tape Association (ITA), 315 W. 70th St., New York, N.Y. 10023

■ Larc Association (Formerly, Library Automation Research & Consulting Services), Box 27235, Tempe, Ariz. 85282

■ National Association for State Information Systems (NASIS), c/o Council of State Government, Iron Works Pike, Lexington, Ky. 40505

■ Numerical Control Society, Inc. (NCS), 44 Nassau St., Princeton, N.J. 08540

■ Pattern Recognition Society (PRS), 11200 Lockwood Drive, Silver Spring, Md. 20901

■ **Simulation Councils, Inc. (SCI)**, Box 2228, La Jolla, Calif. 92037

■ **Society for Industrial and Applied Mathematics (SIAM)**, 33 S. 17th St., Philadelphia, Pa. 19103

■ **Society for Information Display (SID)**, 654 N. Sepulveda Blvd., Los Angeles, Calif. 90049

■ Society for Management Information Systems (SMIS), 18 S. Michigan Ave., Chicago, Ill. 60603

■ Society of Certified Data Processors (SCDP), 38 Main St., Hudson, Mass. 01749

■ Society of Data Educators (SDE), 247 Edythe St., Livermore, Calif. 94550

■ Society of Professional Data Processors (SPDP), Green Lake Farm, Fayetteville, N.Y. 13066

■ **Special Libraries Association (SLA)**, 235 Park Ave. S., New York, N.Y. 10003

■ Tele-Communications Association (TCA), 6311 Ucca St., Los Angeles, Calif. 90028

DP Social Impact Focus of ACM '73

ATLANTA – The pendulum will swing back to the social aspects of computers for the annual conference of the Association for Computing Machinery.

The themes of past conferences have varied, between social implications and more technical aspects, and ACM '73 will focus on "Computers in the Service of Man," according to Dr. I.E. Perlin, conference chairman.

Information on the conference, and on ideas for paper submissions, is available from P.O. Box 4566, 30302. The conference will be at the Hyatt Regency, Atlanta.

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COMPUTERWORLD
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IEEE to Face Political Concerns

NEW YORK – With new constitutional amendments overwhelmingly accepted by members, the Institute of Electrical and Electronics Engineers (IEEE) is expected to embark on new programs of political and economic activity, officials said.

While the final count is not yet available, IEEE President Robert H. Tanner said about 85% of the votes cast were in favor of the new amendments, which generally were to add "matters of professional concern" to the institute's activities.

Similar amendments were narrowly defeated last year, when they did not have the backing of top IEEE officers; this year, they were supported by officials.

Instead of the strictly technical orientation mandated by the institute's charter, the group will now be authorized to engage in matters of legislative, social, ethical and economic concern, officials noted.

Included in the new activities, officials said, would be the preparation of position papers to assist government and other agencies, make recommendations on professional employment practices and establish a pension plan for members.

Appointments, Merit Award Announced

PHILADELPHIA – Herbert S. White, senior vice-president of the Institute for Scientific Information here, has assumed the office of president-elect of the American Society for Information Science (Asis).

He will serve in that capacity until next October, when he will take office as president. John Sherrod, director of the National Agricultural Library, is president for the coming year.

***

Dr. Phyllis A. Richmond, professor of library science at Case Western Reserve University, received the 1972 Asis Award of Merit for her contribution to the understanding of "theory and practice of subject analysis in general, and classification, in particular," Asis reported.

***

Carl Vorlander has been appointed executive director of the National Association for State Information Systems (Nasis), after having served as one of the first presidents of the association.

Societies/ User Groups

Other Society Notes

The Society for Management Information Systems is preparing an award series of new papers, to be published by SMIS beginning next March.

The two best papers will carry cash awards of $1,000 and $500. Information is available from SMIS at 18 S. Michigan Ave., Chicago, Ill. 60603.

***

The Computer Lawyers Group is planning on incorporating soon, with regular membership open to members of the bar. The group's next meeting is March 29.

Information is available from Robert P. Bigelow, 28 State St., Suite 2200, Boston, Mass. 02109.

Updated Picture Of Measurement Symposium Goal

PALO ALTO, Calif. – Computer performance measurement is in the spotlight this week, at FJCC, but the act will not be over when the curtains are drawn on the last of the semi-annual meetings.

Next February, the Association for Computing Machinery will hold a Measurement and Evaluation Symposium here, sponsored by the new Special Interest Committee on Measurement and Evaluation (Sicme).

Session topics will include analytic (especially network) models and workload characterization and program behavior, Sicme officials said.

Other areas of discussion will include simulation models, mathematical theory of performance, performance theory and monitors, plus short notes and "managerial considerations."

Session chairmen represent the computer industry, university and consulting communities.

Officials said a "limited attendance" was being planned for the meeting, Feb. 26-28.

Information is available from program chairman, Prof. Tad Pinkerton, University of Wisconsin, 1210 W. Dayton St., Madison, Wis. 53706.

Library Group, NMA Cooperate

WASHINGTON, D.C. – Computer users need more information on microfilm, and the National Microfilm and Special Libraries Associations are involved in a project to provide it.

The presidents of the two groups announced an intention to develop greater cooperation and establish closer dialogue between their respective memberships.

The library group already has a special representative to NMA, so this is not an entirely new idea, according to Edward Strable, SLA president.

One reason for the increased communication between the two groups is the fact that librarians need an "unbiased source of information about various alternatives available to them," according to Milton Mandel of NMA, headquartered here.

The microfilm group wants to cooperate with librarians to aid in making decisions on micrographics, he added.

No specifics of the cooperative program were announced.

Why lag along with slow data transmission on the dial network? Codex introduces a new 4800 bps Dial Modem that has greater reliability and error-free performance than your old slower one.

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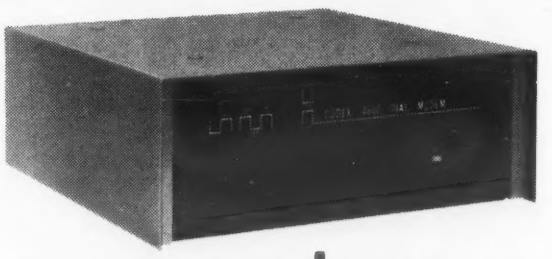

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Critics Fear Privacy Invasion Under Bill for Drug Data Base

LONG ISLAND, N.Y. – Distrust of computer data bases and big government forms the basis of an attack on a proposed law directing New York State to compile a data base of all prescriptions of possibly dangerous drugs.

The New York State Controlled Substances Act directs that all prescription forms for Schedule II drugs be obtained from the state and returned once they are used. Information gathered in this manner is to be entered into a data base telling which patients got which drugs from which doctors.

Schedule II drugs, considered the most dangerous drugs that can be obtained by a doctor's prescription, include Demerol, codeine, methadone, amphetamines and amphetamine-like compounds.

Critics of the proposal charge it is misguided, ineffective, a threat to the legal drug user and an invasion of privacy.

"My concern is if I give you a Demerol, your prescription will be filled, noted in a computer and you will be classified as a potential Demerol user. This is wrong for the public and wrong for the doctor-patient relationship," charged Dr. Leo Fishel, president of the Nassau County Medical Society.

S.B. Jeffries, former department chairman of Pharmacy Administration and Jurisprudence at Brooklyn College of Pharmacy, was even more outspoken.

"The proposed safeguards are so idiotically weak and ambivalent. There's nothing hard and specific about how you are going to protect the confidentiality of the computer records. These are medical records. These are people. If they start with this today, it will be some other aspect of medical care tomorrow," he noted.

A member of the bill's drafting committee countered that he could not blame people for being upset about computer records, but society had a need to control the flow of these substances.

"Let's face it, we know many of the abuses take place in the doctor's office and pharmacies by people more concerned with money than ethics," he explained.

These arguments had little effect on the opposition which stated that less than 1% of drug abuse cases stems from doctors' offices or stolen prescriptions.

"With credit card information and God knows what else, they are simply opening the book on everyone," Jeffries charged.

Fish Industry Model Could Improve Yields

WASHINGTON, D.C. – Fishing industry prognosticators now have more than past statistics upon which to base future plans.

A computer model of the Atlantic menhaden fishing industry, developed by researchers at MIT, is designed to help planners obtain maximum yields of fish without exhausting the supply.

Menhaden were selected for the study because they are an economically important source of oil and fertilizer, and there is more information on them than on many other species, noted Peter S. Weissman, one of the designers of the system.

In addition, consideration is being given to regulating their catch because they have been decreasing, he said.

The model uses a program describing the many interrelated loops and variables that compose the menhaden life cycle. By altering the input, such as life cycles of predators, or number of boats fishing for menhaden, the researchers can gain information on effects of different variables.

T/S Helps Poverty Area Students Improve Reading, Math Skills

CHICAGO – A dedicated time-sharing system for students in high poverty areas with poor reading abilities is succeeding, according to results soon to be made public here.

The system is built around a Univac 418 connected on-line to display terminals in the pilot schools. Students use the terminals for individualized tutoring in reading, language skills and mathematics.

When a student first enters the system, he is asked questions of various difficulties to determine his present achievement level. Once a level has been determined the student must successfully work his way through pre-set lessons.

Designed to Hold Interest

Evaluation of student responses on any portion of the curriculum permits the difficulty level of the next lessons to be adjusted so the student achieves success. This self-adjusting feature combines with reinforcement to ensure a high degree of student motivation.

Reports to teachers show how each student is progressing within each area – e.g., concepts, horizontal addition, vertical subtraction, etc.

The report also indicates which students have not used the computer system that day.

By contrasting scores from daily reports, the teacher can judge the progress of each student and counsel him in difficult areas.

Terminal input during a student session averages 12, 6 and 4 response/min for math, reading and language arts, respectively.

Output in Two Seconds

In the most demanding situation – 480 students concurrently drilling in math – the system could handle the 100 input/sec and give the proper output in two seconds.

Considering the high amount of processing required for each input, a two-second response time is well within the student's attention span, according to a spokesman.

The system was installed one year ago in an area of Chicago that averaged a one-year lag in learning skills. Tests were taken this month to determine the amount of progress these students have made through the computer time-sharing system.

While these results are not yet public, a spokesman for the Chicago Department of Education has stated the results are very favorable.

Flash Fire Spares Firm's DP Complex

JOHANNESBURG, South Africa – Prompt detection of a fire in an airconditioning unit at the South Africa Mutual & General Insurance Co. computer complex here is estimated to have saved the firm about $183,000 in recovery expenses.

A flash fire from a short circuit in the electrical system was detected by an alarm system, which triggered the automatic carbon dioxide extinguishing system and an audible alarm for the caretaker, who informed the fire department.

Damage in the complex, which housed an ICL 1903, was limited to the air conditioning unit and estimated at about $610. Within half a day the center was fully operational and programs were being run on schedule.

Mutual and General, which specializes in computer insurance, estimated it would have cost about $122,000 to use an alternative system, and property damage would have been about $61,000.

Low-Cost, Low-Volume Unit

OCR Relieves Small User's Conversion Problems

By William T. Zeigler
Special To Computerworld

ANNAPOLIS, Md. – Three years ago the Anne Arundel County administration started planning for a computer conversion from a first generation Univac 1001/1005 to an IBM 360/30.

Two of our biggest applications were real property assessments/tax billing/tax receipting and water billing/receipting. Plans were to use a 1404 printer with its bill-feed printer to punch as well as print the bills so the turnaround stubs could be mechanically processed in the receipting operations.

Each application required the processing of approximately 150,000 bills/yr and capabilities for daily receipting.

Printing Problems

Despite the usual difficulties, we made our conversion on schedule and the tax and water receipting operations worked very well.

The only problem was that we had only one printer – the slow, 600 line/min 1404 which rented for almost twice as much as an 1,100 line/min 1403.

Before the end of our first year on the 360 we had almost doubled the number of computer applications and we were running out of computer time. Virtually every job required a printed report and we knew we had to replace the 1404 or get a second printer.

As a solution we decided to lease time from a service bureau with a large optical character reader with minor resystemization of our tax and water billing/receipting. Instead of punching bills we simply added the printing of a single optical read line near the bottom of the turnaround stub.

Although the service bureau solution permitted us to switch to the faster printer, we found it to be something less than an optimum solution and soon started looking for something else.

Ours was a typical small user's problem. Some of our receipts came through our county cashiers while others came through banks. Our tax officer insisted on having a bank code or cashier's code and date of payment in each receipt record. This meant separate batches of documents for each cashier or bank on each payment date.

Additonally, cashiers were asked to make separate batches of receipt documents for those cases in which the amount of payment was other than the amount billed.

The result was so many batches that the OCR reader, which was designed for large volume processing, could not be geared down to handle our small jobs.

A better solution for us turned out to be a small inexpensive OCR unit from Computer Entry Systems.

At a rental cost approximately equivalent to the salary of one keypunch operator, we have the use of a keyboard, an OCR reader, and a tape drive.

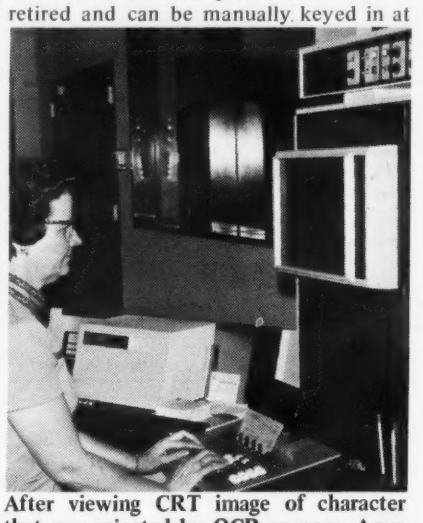
While we have not yet accumulated a lot of statistics I know that an average operator can easily handle 5,000 to 6,000 receipt documents/day. This would include batches of documents varying in size from very small up to a couple of hundred.

Operationally, the 7100 system is simple to learn and takes a keypunch operator about one day of training. Two programs are loaded into the reader through the keyboard – a batch record program and a receipt record program.

A batch card precedes each batch and contains batch totals, date, cashier code, etc. It is keyed onto tape by the operator's use of the batch record program.

The first record of the batch is manually keyed in using the receipt record program which identifies certain fields to be duplicated in each record. Then the remaining records in that batch are fed into the OCR reader.

As the reader reads each stub a tape record is created. Rejected stubs can be retired and can be manually keyed in at the end of the batch, thus maintaining batch integrity.



After viewing CRT image of character that was rejected by OCR scanner, Anne Arundel County operator keys in correct character and allows scanning to continue.

Although our unit is new in the marketplace (we accepted the 5th production model) the reliability has been outstanding. The reject rate for well-printed documents is less than one percent.

We had to have OCR-A font digits slugged into our print train and use printer ribbons recommended for use with OCR processing, but aside from that, no special changes were necessary.

We envision using the reader on other applications soon to be developed. One is in our voter registration system.

In preparation for each election, name cards of registered voters are sent out to each precinct polling place. When a voter comes in to vote, his card is removed from the card file and placed in another file.

After the election, the cards in the second file are used to post to the voter's record evidence of his having voted in this election. Using OCR readable name cards, the second card file could be read to tape for use in posting information to a computerized voter registration file.

William T. Zeigler is data processing manager for Anne Arundel County.

Law Enforcement Link Planned

RENO, Nev. – The Area Council of Governments here has approved a study of the costs involved in tying Washoe County law enforcement agencies into the Clark County police computer system. The study will investigate possible methods of funding the tie-in, as well as determine specific equipment needs for each law enforcement agency.

On-Line Packing System

Computer in Fashion at Fabric Plant

LYMAN, S.C. – The customers served by Lyman Printing and Finishing Company, a division of M. Lowenstein & Sons, Inc., are engaged primarily in the fast-moving high fashion markets. Immediate shipment of the correct goods to the right account at the right time is essential because the fabric must be at the cutting room door on the precise day scheduled.

Lyman processes about one million yards of fabric on a typical day. The finished rolls have to be packed, addressed correctly and legibly, billed to the proper account and shipped – quickly and accurately.

The division's packing and shipping employees are supported by a computer system that helps them handle all the paperwork and get the orders out 25% faster than with a previous manual system with over 75% less errors.

The system controls and monitors the movement of piece goods from the winder through the weighing station via an IBM 2790 data communications system and inquiry terminals linked to an 1800 computer. It updates inventory data, prepares packing slips for cases, piling slips for goods going to open stock, extends out-turn percentages, and prints the lot-closing summary and detail sheets used to determine the finishing costs to be billed.

Inventory Control

Work-in-process and finished goods inventory records stored in disk files have helped improve inventory control and supported substantial reductions in work-in-process inventory.

The system further records the disposition of all piece goods produced for order lots: goods going to packing are reported by the put-up department; and goods for the warehouse are reported by the packing department. This allows comparisons of put-up production against packed production, providing the source information needed for inquiry servicing and lot closing.

Terminals linked to the central computer facilitate immediate responses to customer inquiries. While a customer is still on the telephone, Lyman can give him complete information on any order or production lot which has reached the put-up area.

Data is available as a summary, listing total yards by quality grade, or in more detailed form, listing all put-up, packed, or open-stock transactions against the order.

The system configuration consists of the 1800 processor; ten 2791 area stations with printers attached, used in the piece goods packing areas; another in the paper and burlap area of the put-up department; 2740 communications terminals in the put-up scheduling area, the lot closing section and the inventory and order control section.

Two 2260 visual display terminals are used in the planning department for direct input of finishing order information to initiate the entire processing cycle.

Entry creates a work-in-process order record in the 1800's disk files and the system produces a printed order set and case cards for the packing department. The file is updated as piece good lots are produced.

The winder operators' production reports from the put-up inspection department serve as initial input to the piece goods packing system. The data is entered into the system via the 2740 terminal in put-up, and used to schedule packing operations, service inquiries, provide quality variance data and to update work-in-process files.

In the packing area, the area stations and printers are mounted on mobile carts. The packer works from a copy of the printed order and order card.

Inserting the order card and his own badge into the area station along with the necessary identifying information initiates the transaction. The packer uses the station keyboard, under instructions from the guidance panel, to key in variable order data, such as the number of yards packed for each piece he places in the carton. The system then produces the packing slip on the attached printer.

When the carton is full, the packer presses a total key and the printer records total yards packed on the slip. The packer removes the slip and attaches it and the card to the packed case which he places on a conveyor to the weighing station. These transactions update the work-in-process records.

When packing is completed, the packing department's copy of the order is audited and the system updates the open order files and indicates that the order is complete and ready for shipment.

At the end of the day, the system produces a transaction for each packed case that has not been applied to an order. These transactions are used to update the solid-case inventory files.

A similar procedure is used to prepare piling slips for piece goods bound for open stock inventory.

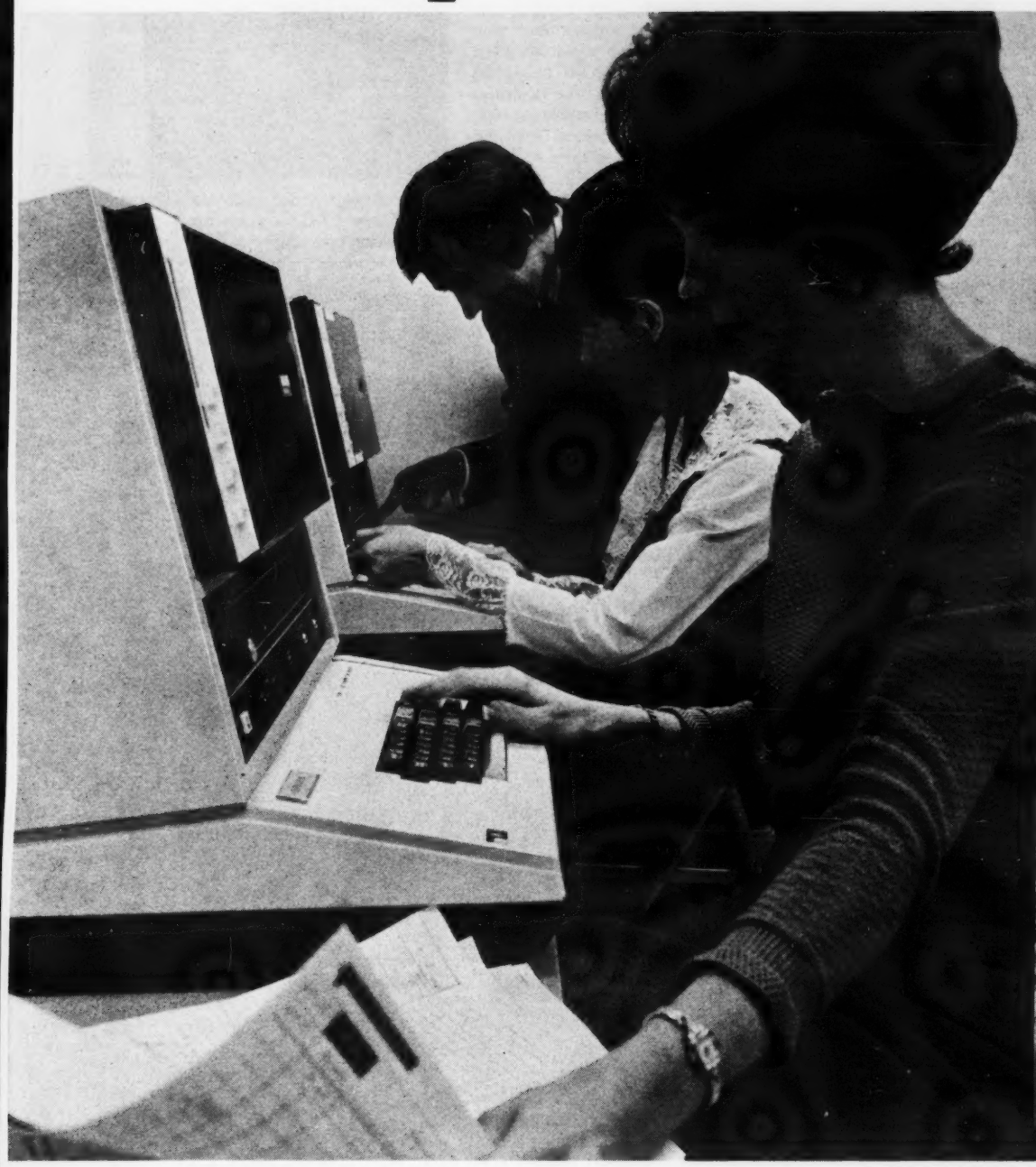
The system produces a daily off-quality report, and pinpoints the responsible department. The report is sent to the department for immediate corrective action.

The system also monitors packing line performance and prints out summaries in the packing office each hour, covering the previous hour's production. It pinpoints responsibility for errors, and the freshness of the data enables packing supervisors to counsel with employees more effectively.

Computer assistance also supports process planning and scheduling, technical processing of cloth, color control, the full operating cycles of the dye becks, and a domestics packing system.

Packer inserts order card and identifying badge into 2741 area station to initiate the packing procedure.

A Singer 4300 key-to-entry and transmission



Mastercraft Industries, Inc., Denver. One of the largest manufacturers of kitchen cabinets, with facilities and sales offices in Dallas and Phoenix.

Mastercraft's present configuration in the Denver office includes a 4311 Magnetic Data Recorder for data entry and transmission, a 4301 for data entry and a high speed line printer. Both branch plants have installed 4311 terminals and high speed line printers.

Ken Sandoval, Mastercraft's controller, says the company switched from an on-line system using a Data-Phone to the Singer* system because it provides precise quantity-item inventory control. However, it is also being used for accounting functions at all locations, including accounts receivable, accounts payable and payroll. And they're considering adding a magnetic data central pooler for inventory tracking.

Has it made a difference? Sandoval is delighted. "Tape input is much faster. . .We realize quite a savings in expensive CPU time alone . . . and the absence of problems has alone justified the change to the 4300 system."

Southern Electric Utility. 21 offices within a 700-mile radius using a central Data Center for billing, accounting, labor distribution, materials and supply inventory.

The offices and the Data Center are each equipped with a 4311 Data Communications Unit. Data is transmitted over the dial-up telephone network daily.

The average office transmits 156,000 characters—or 8400 record blocks—to the Center every month. The average office can transmit a whole day's transactions to the Data Center in 15 minutes or less: eight times faster than with the previous punched card system. The Data Center recorder is now receiving over 200,000 records per month, and has the capacity for over one million records during any given month.

A printout is produced and mailed to each office daily from the Center.

Input into the Center's IBM System 360 is 45 times faster than with the former card system, which used both a keypunch and card reading terminal at each office. Costly mainframe sorting and conversion has been eliminated.

–tape system makes data this easy for you too:

L. L. Ridgway Enterprises, Inc., Houston. Manufacturer of architectural supplies. 30 retail-wholesale outlets in 15 branches, from Denver to Atlanta.

At each branch, accounts receivable, cash receipts and adjustments are recorded on a 4311 Magnetic Data Recorder. It also creates invoice input and verification for computer invoice printout via a Univac 9300. A branch can transmit its weekly transactions by telephone in 45-90 minutes.

Management indicates that the new 4311 terminals were justified on cash flow alone.

4300 Series Magnetic Data Recording System equipment is designed and manufactured by PERTEC, one of the largest manufacturers of key-to-tape systems in the world. The product line is a result of high technology engineering and extensive product testing. Each unit is manufactured in PERTEC's ultra-modern electronic manufacturing facilities under stringent quality controls which assures high quality reliable performance.

For further information, call your nearest Singer Business Machines representative, or write Singer Business Machines, San Leandro, CA. 94577.

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Business Machines that
help you get down to business.

SINGER

Package Express Busbills Receive Express Service With Scanner System

By Connie Walters
Special to Computerworld

DALLAS – Continental Trailways, Inc., carried some 12 million freight shipments in 1971 and the volume continues to grow. For effective audit and revenue control, the company must match origin copies of busbills covering these shipments (50,000 items each working day) with destination copies (making a total of 100,000 separate items a day). In addition, 200,000 charge items must be posted to 38,000 charge accounts each month.

To help with these massive paperwork jobs, the company installed optical scanning devices that read and electronically transfer information directly from paper forms to a computer.

By automating much of the huge job of matching origin and destination copies of busbills, we have reduced boring, error-prone manual routines and tightened audit control through faster, more positive matching.

Cash receipts within Continental terminals and bus stations are accounted for positively.

By exposing unmatched bills, the system identifies interline bills that require special handling in order to assure collection of prorated amounts due us from interline carriers. Increased interline revenues alone involve sums substantial enough to pay for the entire system.

In the accounts receivable area, automated magnetic ink character recognition (MICR) reading and sorting techniques have significantly reduced the cost of posting to charge accounts and preparing 18,000 statements each month supported by busbill copies substantiating each charge.

We installed an IBM 1287 Optical Scanner in early 1971 and issued new busbill forms numbered in special type font readable by the scanner.

Under this system, the freight manager at a Continental dock enters normal data, i.e. name and address of shipper and recipient, charge for delivery, C.O.D. information, etc. for each shipment. He gives one copy of the form to the shipper, keeps one for insertion into the station agent's report to headquarters, and places the remaining two parts face up in a clear plastic envelope which permits easy reading of the delivery address. The pressure-sensitive adhesive back of this envelope is pressed onto the package.

When the package reaches its destination, the express department at the destination terminal removes one of the two copies from the envelope and has this delivery receipt signed by the consignee. This receipt is sent to headquarters with the station's regular daily, weekly or monthly report.

After initial revenue report auditing and balancing, the busbills received from the reporting stations are sent to the DP department in batches, preceded by "header" forms, identifying the station from which each batch was received and the report date.

The headers and busbill batches are fed into the optical scanner, which reads the header information for each batch and the individual busbill number on each item, simultaneously printing a serial number on the front of each busbill.

In the same task, the scanner transfers station number, report date, busbill number and the serial number to a magnetic tape on one of four 3420 tape drives operating under control of an IBM System 370/135. The processing or "cash date" for the entire day is entered via one computer keyboard entry.

The computer merges this information with data on another tape containing, at any given time, approximately 750,000 unreconciled busbill numbers; that is, origin or destination copies not yet matched. Numbers matched by "hits" on the new tape clear the audit and are removed from the list.

Origin copies which have not yet been matched with delivery receipts bearing the same number or vice versa, are printed out for management action.

When delivery copies cannot be matched with origin copies in a given period of time, there is a possibility that the origin station neglected to report the shipment and further investigation is indicated. It is also possible that another company participated in handling the shipment and it has, therefore, become an interline item requiring special attention.

The idea of using a MICR reader-sorter to process charge account busbills grew from the realization that busbills are not too much larger than demand deposit checks used in the banking industry.

We installed an IBM 1255 MICR reader-sorter and three IBM 1203 MICR magnetic inscribers in early 1972.

Under the system, the busbills to be charged to accounts receivable are first routed to inscriber operators. They use the key-driven machines to inscribe account numbers and charge amounts on the busbill itself in magnetic ink.

The busbills are then fed into the MICR unit. It simultaneously sorts busbills to account number sequence and reads the charge and amount data into the computer. The computer posts new charges to account addresses maintained on magnetic disks.

Connie Walters is vice-president, revenue accounting, Continental Trailways, Inc.

Plotters Simplify Waste Collection, Weather Maps

The use of on-line plotters for CPU outputs can often help to optimize otherwise complicated applications.

At Owen and White Inc., a consulting engineering firm, solid waste collection for several cities has been optimized with graphic plots of the best routes.

Using the firm's own software package for Route Analysis Generation and Simulation (Rags), waste collection routes are plotted over aerial photos of a given area, assigning XY node designations to intersections.

The company uses a Calcomp 602 flatbed plotter on which the base map is placed. After any digitizing errors are corrected, blueline copies of the routes, superimposed over the base map, are supplied to field crews.

The Rags system provides a feasible method for solving routing problems in large cities. A similar problem run by IBM for a 1,600-home subdivision reportedly took 23 hours while the Rags system together with the flatbed plotter performs the same analysis in minutes, according to the firm.

By using the plotter on-line to an IBM 1130, Owen & White can input reports from field crews and under CPU control, a graphic edit of the data base can be run out. The firm originally tried to optimize the routing problems without a plotter, but the result "was riddled with errors without this means of editing," according to Eugene H. Owen, president.

At Ocean Data Systems Inc. Varian Statos electrostatic plotters are used to draw contour weather maps that have been transmitted from remote sites. The digitized maps are drawn for the U.S. Navy to keep track of such critical parameters as pressure fronts and wind directions at selected geographic areas around the world.

The digitized weather data is transmitted at speeds up to 4,800 bit/sec over full-duplex facilities from CPU to CPU by a system of CDC 6500s.

The contour plotting methods can also be used in such applications as plotting the magnetic field above the Earth's surface, according to Howard Straus, senior associate at Ocean Data. Oil exploration data and landscape maps could also be generated using the same methods that generate the Navy weather data, Straus said.

The digitized information that is transmitted is first compressed to drop redundant bits. After it is received, the data is "reconstituted" and extensive error checks are performed by the CPUs to assure that the data has been accurately received, he said.

At each site, a CDC 3200 acts as a front end to the 6500s and formats the data for plotting on one of the Varian units. The electrostatic plotters have speed advantages compared with the individual pen types, according to Straus, who said it would be prohibitively time-consuming to output the data on other types of plotting units.

In addition to plotting weather maps, Ocean Data also uses plotters to generate the transmission of sound rays under water. This type of data is more meaninful for the user in graphic form than when represented numerically, he said.

While much of the plotting software used to generate the weather data was specifically written for that application, Straus said the programs are not unique. Many of the principles used to generate the weather software have been applied to more general-purpose plotting programs, he added.

Banks Save Space, Money, CPU Time With COM Systems

Banks are one of the largest – if not the largest – users of computer output microfilm (COM) systems and, if two installations prove the point, are more than satisfied with the technique.

Both of the installations, using equipment from different manufacturers, report significant cost reductions both in computer time and in paper and other costs traditionally associated with output devices.

But most of all, the U.S. National Bank in Portland, Ore., and Mercantile-Safe Deposit & Trust Co. in Baltimore, Md., like the savings in space the COM units permit, especially since banks have to keep a large volume of computer-generated records over a long period of time.

Saves $100,000

U.S. National estimates it is saving over $100,000 a year on computer printout handling and storage costs with a Pertec 3700 COM unit that is currently processing the equivalent of 500,000 printed pages a month.

The savings estimate does not include the time gained on the bank's IBM 370/145 that was used for printing and now can be used more productively, according to Lowell Brisbin, vice-president for administrative service.

In addition to the elimination of printing, decollating, binding and labeling of paper printouts, Brisbin said the microfiche system cuts the time needed to retrieve filed information by as much as two-thirds.

There are currently 96 branches, nine departments, the Bank Americard center and the Commerce Mortgage using the U.S. National system, Brisbin said. They produce 23 reports ranging from savings and consumer credit to various trust and accrual records.

At Mercantile, Joseph A. DiGuardo, vice-president for banking services, predicted the bank is saving up to 30% of its IBM 360/50 processing time by going to the COM unit.

In addition to that savings, the bank said an "immeasurably valuable" reduction in lookup time, fanfold paper costs and storage space resulted from turning to the Memorex 1600 Series COM system which produces the equivalent of more than 200,000 paper pages a month.

Space Savings

The space savings are impressive. "For example, we have a correspondent bank which has storage space limited to the equivalent of six months of computer paper printout," DiGuardo said. "Our new COM system will permit this bank to store 78 years of computer-output-microfilm in the same space," he added.

"That can save a lot of rental money in expensive urban areas," DiGuardo stated.

The documents processed on the system at Mercantile include all demand deposit reports, time deposit reports and monthly statements to 100,000 customers.

"As the bank grows and our computer applications grow along with it, our paper expenses would have gotten out of hand," DiGuardo said.

"COM will let us grow significantly without having to plan for conversion to new information storage and retrieval systems," he added.

DP Is Tool Manufacturer's Tool for Efficient Shop

BARBERTON, Ohio – Unlike many companies installing a computer, payroll was not the first application put on the system at Wright Tool & Forge Co. Neither were the first reports designed for top management.

The computer started with the simple task of printing a straight listing. Every morning at 10:00 a.m. each foreman would turn in a form describing what jobs he moved out of his department and to what departments he moved them.

The information on the form was keypunched onto cards; the computer processed the data and printed a 1200-line report. By lunch time, each foreman had a printout that told him what jobs were in his department.

Because the foreman could use the output, he was more willing to supply the input. And besides winning the acceptance of foremen, this simple program was ideal for initial training of computer personnel, most of whom came from within the company.

More than 150 programs were written for the order entry and finished goods inventory application. There are 500 items in the Wright line and customers may order loose tools, sets of socket wrenches or merchandise display units.

Wright Tool receives between 10 and 250 customer orders a day. Orders are edited against a customer master list to verify addresses. Changes are processed every day prior to running orders to maintain an accurate master file.

Orders are coded to note one-time exceptions in prices, commissions, shipping instructions or payment terms. Coding is also done to handle special prices during promotional campaigns.

Order approval is another function improved by the NCR Century 100 computer. Orders are routed to the credit manager when a customer exceeds an established credit limit. Orders that do not meet minimum dollar amounts are flagged by the computer so the customer can be warned of a service charge or asked to order more tools and avoid the service charge.

Invalid numbers and obsolete tool numbers are referred to the sales department which may suggest a substitute tool.

A record of every order is kept on disk files. A separate disk maintains orders being held in the office for customer clarification or for credit.

Line Items Compared

Eighty percent of all orders are filled completely and shipped within three days. The system automatically compares line items on the customer order with line items in finished goods inventory.

Orders will not be released to the shipping department unless items are actually available. Out-of-stock conditions occur on less than 1% of the items because order entry is tied directly with finished goods to provide positive inventory balances and efficient production scheduling.

When orders are released to the shipping department inventory is automatically reduced. Production is usually scheduled around an economic order quantity formula which is recalculated every year. If inventory balance goes below a predetermined order point, production is notified to expedite; if a zero balance occurs, production is rushed to eliminate the out-of-stock condition.

Socket wrenches require between 10 and 30 manufacturing steps. While an order is in production, it can be in any one of nine departments.

A daily computer printout identifies the exact location of each order. This report is particularly valuable for answering customer inquiries. Orders are listed on this report for 30 days after they are shipped, giving the carrier and date shipped.

Another report lists all orders released to the shipping department by carrier and by weight. This report offers three possible routings: primary carrier for shipments under 200 pounds; alternate carrier; parcel post or UPS for shipment under 200 pounds.

This report helps the shipping department organize orders before the carrier's truck arrives. For example, it is less expensive to ship an additional 100 lbs. with one carrier than it is to pay for a separate, 100-lb. delivery.

Other reports generated include a backlog report of all unshipped orders; periodic sales reports; and a variance report which pinpoints mistakes in transfers between departments.

"One of the most important things a computer can do is organize the same data into different levels of information," said Wright.

Foremen benefit from daily work scheduling reports. The production manager and shipping department manager benefit from detailed progress reports. Sophisticated summary reports, not feasible with manual systems, can be developed for management decision-making, Wright said.

Mini-Maxi Debate Stalls at Midfield

Special to Computerworld

PASADENA, Calif. – A debate between advocates of minicomputers and maxicomputers not far from the site of the Rose Bowl produced some interesting scrimmages but neither side was able to penetrate much beyond "midfield."

There was general agreement that each machine has a role but there was no clear definition on what it is.

The closest things to guidelines for decision were: "an elaborate problem requires an elaborate machine" and "size depends on the ability to administer it."

The debate was part of a recent one-day conference on advances in computing.

Fernando Corbato, co-head of systems research for Project MAC at MIT, suggested the mini-maxi problem may be resolved in time with the development of a virtual maxi on a true mini.

The severest limitation of minis, he said, is the problem of storage management which can create serious software problems.

Corbato, who spoke for the maxis, conceded that minis allow users to bypass bureaucracy, but he cited a loss of function with simplicity and less sophistication in software.

David Farber, associate professor of information and computer science at the University of California, Irvine, said the future lies with minicomputer networks.

Networks, he said, can offer advantages such as security, large data storage, ease of growth and the psychological benefit that the user feels his mini is his and only his.

Dr. Bernard Galler, associate director of the University of Michigan Computing Center, argued that maxis give a greater variety of services to the users and are better able to serve the changing needs of users.

"Minis are not feasible when you have 14,000 people working on a single problem," he said.

'Mr. Chips' May Assume New Image

COLUMBUS, Ohio – Next year Ohio State University will graduate the first class of physicians who can look back on the old professor and think of an IBM 360/40.

The practice of using computers instead of professors started in 1969 when the freshman medical school class was broken into two groups. The first group spent the majority of its study time interacting with the computer while the second group used the conventional classroom technique.

"The ultimate objective of this system," said Dr. Richard Meiling, vice-president for medical affairs, "is to boost our ability to process more doctors through school without having to increase our physical plant or the size of our medical faculty."

Students in the first group had access to six terminals kept online to a central computer for 22 hours each day, six days a week. Any time the student wanted to use the system the computer would load the desired study program to the desired level and direct the student to activate a companion slide film projector.

Using the video aid, the computer and student followed an interactive course of question and answer.

After the first two years of text-book medical education the two groups were merged for the final two years of hospital training.

During the entire period tests were given to determine the standings of the two groups. A university spokesman stated the computer trained students did just as well as the conventionally trained in most areas and better in others.

An offshoot of the computer system is that it frees staff members to spend more time in one-to-one counseling situations with students, making medical education more personal than before, Meiling stated.

Mini Adapts to Space Lab's Needs

PASADENA, Calif. – The use of minicomputers to check out instruments aboard spaceships has effected some changes, not only in the increased reliability of equipment, but also in the attitudes of men involved in launching and monitoring the missions.

Before Mariner 9, the California Institute of Technology Jet Propulsion Laboratory Flight Data Systems Support Equipment unit used "special-purpose equipment for each probe, tearing everything down and starting over again for each new project," according to manager Fred Conklin.

But now, the engineers think of the minicomputer as a "programmable box of logic" which they adapt to changing requirements. Instead of building new hardware for each new checkout, they program changes in the software.

Project engineers claim they get almost 95% efficiency from the Varian Data Machine's 620 units. "When a malfunction occurs in the overall system, we automatically look for human error," Conklin said.

The minis are used to check instruments aboard the spacecraft down to the component level.

"With a mini, we all know how the entire system operates, hardware and software. So we can start troubleshooting before we know for certain where we'll find the problem," Conklin said.

'Fear Not the Machines'

LEICESTER, England – The world will never be taken over by a race of super-computers because a three-year-old child is smarter than a computer, a British professor claimed recently.

"There doesn't seem to be much difficulty in having the computer learn to solve a problem once the problem has been formulated. The real difficulty is to get the computer to see there is a problem there at all," according to N.A. Mitchison of London University College.

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Truck Scheduling Program Optimizes Newspaper's Home Delivery Service

By John Neubauer
and Sam Verdeja
Special to Computerworld

MIAMI, Fla. – By 6:30 each morning, the *Miami Herald* delivers a copy of the paper's final edition to some 240,000 home subscribers in sprawling greater Miami. A computer-based vehicle scheduling program helps us to deliver these newspapers and do the job a lot better.

Subscribers get final edition newspapers on time every day of the week, including Sunday, and some 15% fewer delivery trucks are required to run daily routes.

The number of bundle drop points is down from 400 to 270 and the average daily mileage driven on all routes is lower by about 150 miles.

Complicated Job

The scheduling and delivery of newspapers to the *Herald's* city zone substations is complicated.

To begin with, the greater Miami market takes in about 2,054 square miles. In addition, carrier routes range widely from under 200 papers to as many as 500 papers, with service time varying from about one hour to three hours or more. We have the usual variance in paper size, with the Thursday and Sunday editions running especially heavy.

The number of papers in a bundle must always be in multiples of five, and for health and safety reasons, we have a 40-lb weight limit for each bundle.

Marked variation in both circulation count and paper size results from the winter visitors to the area.

The *Miami Herald* is one of the few newspapers in the nation that uses rented trucks and drivers to handle deliveries. IBM's Vehicle Scheduling Program (VSP) allows a daily fluctuation in the number of trucks and drivers to be used, without requiring the *Miami Herald* to maintain a minimum number of vehicles. This equipment inventory burden is passed on to the rental company, and the paper pays for only the number of trucks used each day.

VSP consists of two computer programs – network analysis and schedule production. The network analysis program sets up the distance and/or travel time, and relationships of all present and potential delivery points to the truck loading dock, and to each other. The schedule production program uses this data to produce the optimum vehicle routings.

The more involved network analysis program is run once, and is not repeated unless there is a major revision in the delivery point structure.

Input to the network analysis program is a grid coordinate system: the distances from the midpoint of each half-mile square in a grid overlay of greater Miami to the midpoint of each adjacent half-mile square. This automatically provides identification of delivery points that might be used in the future.

The grid coordinate method also enables us to identify, and consider in computer analysis, natural travel barriers, like the expanse of water separating Miami Beach from Miami, with access only via causeways.

Working with the input data, the computer calculates and then stores on magnetic disk files the minimum distances between the *Miami Herald* truck dock and every square on the grid, and the minimum distances between every half-mile grid square and every other square. This minimum distance information is available whenever required for use with the schedule production program.

The schedule production program also works with current data relating to delivery requirements – the number of papers for each carrier route, where the bundles are to be dropped off, the latest possible drop-off time in order for the carrier to complete his rounds before the 6:30 a.m. deadline, and other information needed to calculate route duration times.

Using this data, the computer prints out, for each delivery truck, a sequential listing of stops that includes the drop point location and number of paper bundles to be dropped, the numbers of the routes served and the total elapsed time for the truck run.

With VSP we know exactly where each truck is going, when it will get to each drop point, and how long it will be out on the route. We know which trucks on short runs we can bring back for a second run that would still enable the carriers to complete their routes on time.

John Neubauer is an industrial engineer and Sam Verdeja manager of circulation administration and out of state bureaus at the Miami Herald.

Rail Ticketing Speeded

MONTREAL – Railway tickets that can be read by optical character recognition equipment are being introduced in the Canadian National Railway.

The tickets are part of the railway's Passenger Revenue Reporting System and will be used to calculate by computer sales information and travel trends.

COMPUTER INDUSTRY

CI Notes

IBM's GSA Share Drops

WASHINGTON, D.C. – IBM's share of computer-related contracts issued by the General Services Administration (GSA) during fiscal year 1972 dropped dramatically, while the share awarded to non-mainframe makers rose drastically, according to GSA figures.

IBM won 29.4% of the contracts awarded for the year, down from 46.1% the previous year. The non-mainframe makers won 25.2% in 1972, up from just over 8% the year before.

Control Data received 16.2% of the GSA contracts, while Honeywell got 10.8% of the awards during the year.

Data Products Printer Planned

ANAHEIM, Calif. – Data Products is taking the wraps off a low-cost, medium-speed line printer at the Fall Joint here this week.

The 2230 prints at 300 line/min in a 132-column format and will be available in both end-user and OEM configurations.

Supershorts

System Development Corp. has made its first major entry into the international marketplace with the acquisition of a 35% interest in the German software firm, dSE, headquartered in Bremen, Germany.

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ITT Data Services will market and provide support of Applied Data Research software programs throughout Latin America, under a recent agreement between the two firms.

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Computer Terminal Corp. has shipped the 1,000th Datapoint 2200 system since going into volume production in the second half of 1971. The shipment figures do not include shipments of the Datapoint 3300 and 3000 Teletype replacement terminals.

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Telex Computer Products has delivered its IBM 3330-compatible 6330 system to six customer locations in the U.S. and Canada. Deliveries to the UK are expected to begin next month.

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Incotel will design and implement a computerized communications system under a $150,000 contract with ITT World Communications.

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Riker-Maxson Corp. has started production on the Model 2011 intelligent terminal and 50 of the units have been installed at the J.C. Penney Co. for catalog order entry.

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Xynetics S.A., based in Brussels, has been formed by a consortium led by Xynetics Inc. to manufacture drafting systems for information retrieval and automated drafting in Europe.

Security Device Market Still in Infancy

By a CW Staff Writer

Except for the access control area there does not appear to be a large market for security devices among computer users, in spite of the increased awareness of security needs among large computer installations.

That is why most of the major mainframe makers and independents are not now pouring a major segment of their resources into the development of data protection devices or software.

The one notable exception is, of course, the IBM-sponsored $40 million study of data security methods announced at the Spring Joint Computer Conference last year by outgoing Chairman T. Vincent Learson.

But even in announcing that study as a major IBM project, Learson admitted the market was underdeveloped and customers were not clamoring for new developments or pushing the manufacturers to make new devices or systems.

Computer users' concern for data security is "still on the back burner," he said then, noting that manufacturers have not developed better safeguards because there has been "little market demand" for the devices.

And it seems that little has changed in the seven months since Learson's speech.

IBM, however, is not the only firm anticipating a demand for security devices in the future, but it seems to have stolen the show from others with an interest.

Spotlight On Security

"I can see that in the future many users will become increasingly concerned about the protection of data," one marketing man said recently, "especially as they develop more widespread management information systems that include more company-sensitive data."

But, he admitted, "we are not starting a program in this area on a large scale, because there is so much work being done by the government and private research groups.

"We expect to see some techniques developed that we will be able to adopt in the next few years. So when the demand comes, we will be able to meet the need, without having spent a large amount of research money at present on possibly unproductive projects."

The problem with the market, basically, is that the user does not at present want the problems that are caused by sophisticated data security systems.

"Any user who goes to the trouble to scramble data or store it in an encrypted form is opening up a whole new group of operating problems," another marketing man said.

"For example, he knows that he's going to get into trouble when the VP forgets the day's code and can't access the data base. Until these devices are easy to use, there won't be much of a market," he added.

On the other hand, there seems to be a boom in the market for physical access devices such as badge readers, monitoring systems and other forms of access controls.

But these devices are rarely offered by a mainframe maker and are more the province of independent security consultants who often adapt procedures and equipment used in other security projects for the DP community.

Legislative Action Planned

Patent Decision Leaves Uncertainty

By E. Drake Lundell Jr.
Of the CW Staff

WASHINGTON, D.C. – The recent decision of the Supreme Court on the Benson-Tabbot software patent [CW, Nov. 29] has confused the software industry more than enlightened it, industry sources indicated last week.

Industry leaders agreed the wording of the decision was vague and open to several interpretations ranging from a complete ban on all software patents to a ban just on particular patents that fit the mold of the Benson-Tabbot application.

All agreed, however, that the Benson-Tabbot case was a poor one on which to base a decision that could affect the entire industry.

"The decision is not as bad as we thought at first," according to Martin Goetz, vice-president of Applied Data Research, which presently holds two patents on programs.

The decision only involved process claims, he said, which have no end use or useful purpose and not apparatus claims or claims for patents that have an end use.

"Most of the programs that apply for patent protection would be of the apparatus type," he indicated, adding, "at least we hope that is the interpretation the Patent Office gives to the decision."

In addition, Goetz indicated he felt the decision did not completely block all process patent claims, but rather that it narrowed the scope of what could be claimed in a patent of this type.

Dr. Walter Bauer of Informatics indicated his firm had "never regarded patents as all that important," anyway, noting, "we have very adequate protection for business purposes through trade secrets, contracts with customers and employees and through copyrights."

At the same time, Bauer stressed that Informatics had viewed patents pretty much as "icing on the cake," in that they would be nice to get if it weren't inordinately difficult, but not necessary to operate the business.

In addition, Bauer said there would be many problems with enforcing patents if they were allowed across a wide range of software programming.

Future Direction

While there was still much confusion in the industry about the impact of the decision, many industry observers were planning for possible legislative action.

The center for this effort will probably lie with the Committee for the Protection of Software, which was established by the Patent Office over a year ago and which has been dormant since June, awaiting the Benson-Tabbot decision.

In its last meetings, the committee, made up of 35 members, basically backed the idea that programs were patentable, but was starting work on possible future legislation that would protect software if the Supreme Court held otherwise.

The committee, which includes representatives from hardware manufacturers (at least IBM and Burroughs), the independent software companies, 10 government agencies, university people, leasing companies and several large users, has already rejected the IBM registration idea as not strong enough to provide the needed protection.

But, sources close to the committee indicated that proposals currently under consideration do contain some of the ideas in the IBM proposal.

While several sources are holding out for full patentability for software, many industry observers indicated they agreed with the IBM position that some new form of protection was needed for the software producers.

"We agree with IBM," Bauer said, that some form of protection is needed that falls somewhere between the present copyright laws and the patent laws – that provides more protection than copyrights, but that is not as hard to get or enforce as patents.

Minidisk System

Per Data Unit Stores 44M Bits

HICKSVILLE, N.Y. – A disk storage system for minicomputers, the DP-1A, that offers capacities from 11M bit to 44M bit has been announced by Per Data here.

The system, made up of one disk controller and from one to eight disk drives, provides read, write and select routines and a diagnostic program as standard features.

The controller can be mounted in a standard 19-in. rack mount and the disk itself can fit into a drawer or panel on the rack. Specific interfaces are available for the Nova and Supernova lines; Honeywell 316 and 516; Varian 620/i and 520/i; the Dec PDP-8 and PDP-11; the Lockheed Mac-16; and the Hewlett-Packard 2114, 2115A and 2116B, the firm said from 102 New South Road., 11801.

Litton Serial Printer Available

CARLSTADT, N.J. – An asynchronous serial I/O printer with printing rates of 10, 15, 30, 60 or 120 char./sec is available from the OEM Products Division of Litton ABS.

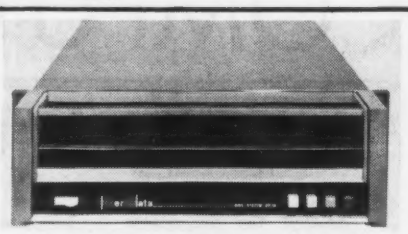
The OEM 120 provides 96-upper and lower-case characters and prints up to 132 char./line with 10 char./in. horizontal spacing and 6 line/in. vertical spacing. Paper feed is single step, 25 step/sec.

Parallel entry (DTL/TTL compatible) or serial entry from RS232B-compatible modems is standard. The unit is capable of serial or parallel transmission, full- or half-duplex mode and even or odd parity check for terminal applications. The unit comes in six different configurations with a price as low as $2,088 complete with power supply, according to the firm at 600 Washington Ave., 07072.

New OEM Products

Other New OEM Products

Sykes Datatronics, Rochester, N.Y., has introduced a new cassette transport, the TT124, in both read/write and read-after-write versions that is compatible with Ecma and Ansi standards. The unit carries a price tag or $450 and has read/write speeds of 5- to 12 in./sec, according to the firm at 375 Orchard St., 14606.



Per Data DP-1A Minicomputer Disk

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A new data communications interface package designed to meet the specification of the Naval Tactical Data Systems has been introduced by Rolm Corp. for the Ruggednova severe environment computer. The $4,500 unit is available in an 8-, 16- or 32-bit-wide configuration according to the firm at 18922 Forge Drive, Cupertino, Calif., 95014.

– – –

A portable digital cassette recorder, the STR-200, designed as a paper-tape replacement offers a density of 2M bit per cassette for $495 in single quantities. A read/write rate of 125 eight-bit char./sec is provided, according to Electronic Processors, Inc., 5050 S. Federal Blvd., Englewood, Colo. 80110.

Litton OEM 120 Printer

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Solid-state 12-key and 16-key numeric keyboards with current-sinking outputs are available for evaluation on an off-the-shelf basis from the Micro Switch Division of Honeywell, 11 W. Spring St., Freeport, Ill. 61032.

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Decision Data, Horsham, Pa., has announced the 9640 Printing Punch for 96-column card applications. The units can punch and/or print 96-column cards at a rate of 120 to 240 card/min depending on the number of columns punched. A field-installable, 1,000 card/min prepunch read feature is optional from the firm at 100 Witmer Road, 19044.

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Standard Microsystems Corp. has developed the SMC N-4412, a 4K-bit electrically alterable RAM with decoding and sensing contained on a single monolithic silicon structure.

The silicon die about the size of current 1K-bit configurations, and access time is less than 180 nsec, the Hauppauge, N.Y., firm said. Production pricing is expected to achieve 1/4 cent/bit by 1974. Prototype quantities will be available in January 1973.

– – –

Mohawk Data Sciences Corp., Herkimer, N.Y., announced the MDS Contactless Keyboard, in which a concave metal capacitor element generates signal impulses that drive MOS encoding circuitry directly.

Customized LSI encoding permits key code assignments in any code up to 10 bits in mono-, dual-, tri- or quad-level shift modes.

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A "build-it-yourself" LSI modem kit, the I.I. 300, developed by I.I. Communications, Willow Grove, Pa. is available either assembled or in kit form.

The unit is a 300 baud, asynchronous, full-duplex serial digital data set. Quantity orders cost $65 per unit.

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Mohawk Industries, Inc., Easton, Pa., has introduced the Series 3127 power supplies that slip into a card cage alongside the circuit boards.

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An automatic pressure measurement/control system from Texas Instruments Inc., Houston, combines Model 156 Precision Pressure Test Sets with the Model 960A Industrial Automation Computer.

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The Data Systems Division of Gould, Inc., has developed a linearity correction circuit, Model LC2656/2676, for use in the electromagnetic CRT deflection systems for special display requirements. The circuit consists of four all-silicon solid-state units. Three standard models are available for deflection angles of 26, 42 and 52 degress and cost $1,035.

– – –

Video Data Systems, Inc., Plainview, N.Y., has introduced the Model CG105 data display unit which consists of a full screen memory, central timing and a serial Ascii input. A 512 char. memory provides up to 16 lines of 32 char. Prices for the unit, available as three printed circuit boards with a prewired backplane connector, start at $595.

Evolutionary Hardware

DEC Puts Research Emphasis on Software Programs

By E. Drake Lundell Jr.
Of the CW Staff

MAYNARD, Mass. – Besides its recent major push into the commercial DP marketplace, most projects under way at Digital Equipment Corp. point toward increased software development with only evolutionary changes on the hardware side of the firm's product line.

For the move into the commercial world on a large-scale the firm naturally had to concentrate a large part of its effort in software development, and this attitude seems to have carried over into DEC's more traditional markets.

"We're in the strongest programming position we have ever been in," according to Dick Clayton, manager of the PDP-11/45 group at the firm.

Most of the hardware development dollars at the firm, he noted, were currently oriented toward the development of peripherals for specific industries.

'Major Development'

But at the same time he stated there was a "very major" software development effort under way and estimated the firm could well be spending more research money on software than it was on hardware at the present time.

This should be a particular help to the 11/45 line, he indicated, claiming the device was at present a "hot box."

"On raw specs the 11/45 can compete against the IBM 370/145," he said, but admitted that DEC did not have the software "right now" to fully exploit this power.

Because of this, many of the first 140 of the units shipped have gone to computer lab types, large-scale systems houses and to the industrial area, all traditional strong points for DEC's marketing efforts.

Business Area

Clayton, however, projected that much of the expected 40% to 50% growth rate for the product line would come in the area of business data processing, based largely on the completion of present software projects.

Currently the average price of 11/45 systems being shipped is in the area of $60,000 to $70,000, he said, but estimated the average value would rise to around $100,000 in the next year, reflecting the increased amount of peripheral equipment typically purchased with business-oriented systems.

The 11/45 allows the user to order bipolar, MOS or core memory or to mix all three, he noted, indicating that most users presently were opting for a mixture of MOS and core in their systems.

"It is rare for a user to mix all three," he said.

Graphics Outlined

In the graphics area, Ed Kramer, who is responsible for Education and Lab Systems in addition to the Graphics Group, said the major software effort was to develop tools to make graphics-oriented systems easy to use.

"We have done several straight applications packages in-house," he said, but admitted most of the development in this area was usually done in conjunction with systems houses or with specific customers on a joint basis. Usually these developments are made available through the Decus user group, he noted.

Users were becoming more familiar with graphics and more sophisticated in using graphics systems, he noted, so that with the right tools they could generally tailor graphics applications to their own particular needs.

Even in the education area, Kramer said, the emphasis in software development is to design easy to use user tools and let the user do much of the applications programming, either with help from DEC or on his own.

The three-year-old Medical Systems Group has been able to use standard hardware in about 80% of the cases but has had to develop a lot of software in order to improve clinical medical care, according to manager Bill Segal.

To do this, the group had taken two approaches.

Company Profile

First, it has developed specific products aimed as special applications like the Rad-8 and Gamma-11 for radiology applications and the ECG-15 for analysis of electrocardiograms.

The other direction has been the development of the Mumps language and operating system which provides a data-base management system for hospitals, which can then tailor specific application programs to their own needs.

The medical marketplace, he indicated, "is a high support market" and there are some medical applications that are not ready yet for automation.

So while there is some movement toward complete systems for doctors and hospitals, most of the efforts are in limited applications which will later be integrated into overall systems.

The trend at DEC is the same in the communications area – providing communications users the tools they need to design their own specific applications programs. Here the main emphasis is on the Comtex operating system that can be used both in front-end applications and remote applications.

The typesetting market, which represented the firm's first entry into a specific user-oriented vertical market when formed seven years ago, represents the same type of trend, according to L. Clark, assistant marketing manager.

This market, he said, is extremely user-oriented and in most cases the firm provides systems to these users that don't even require the service of a programmer – a completely turnkey system.

Success in this area has primarily been in the field of newspapers, he indicated, noting that one out of every three daily newspapers presently uses DEC equipment for some typesetting applications.

In addition, he said there was presently an increased emphasis on on-line editing and that the typesetting market was moving out of the batch mode into more on-line applications

In all, it appears that DEC is trying to overcome its reputation as an "iron" company with little or no software capability by putting the major part of the firm's resources behind software development work.

DP Specialists Have 'Responsibility' To Society for Effect of Their Systems

TORONTO, Canada – "If the computer specialist does not fulfill his responsibility to society, he will suffer as a human being and as a computer specialist," according to Dr. Harvey S. Gellman, president of DCF Systems Ltd.

Gellman told a recent meeting of the Canadian Information Processing Society here that computer specialists, such as designers and engineers, play a dominant role in determining how "computers affect people" and as such have a definite responsibility to society at large for the effect of their systems.

Looking at computer technology, Gellman said, "we must admit it tends to make people dependent on machines instead of people. It can therefore drive people apart and make our society less humane."

Public Affected

While some people argue that computer specialists have little effect on society at large, Gellman said, "we must recognize that the computer specialist who develops a system used by the public will certainly affect the public.

"The quality of the systems produced by computer specialists, and the use to which these systems are put, will determine whether they have good or bad effects on our society," he added.

The unfortunate thing about technological developments, in Gellman's view, "is that the adverse effects tend to show up too late. They are rarely visible in the early stages.

"So, if we let our information systems develop haphazardly, we run the risk of losing control of our computer systems," he added.

Regulation Next

"As a computer specialist, he may find himself coming under government regulation. As a human being, he should never forget that bad systems can affect him adversely as a citizen," Gellman predicted.

While Gellman admitted "most computer specialists I know are kind-hearted, it is not enough for them to have good hearts, they must also have competence."

But while competence is essential, Gellman said, "it is not enough. The computer specialist should also have a high level of integrity and ethical standards."

Unfortunately, he said, "I have seen several cases where computer specialists have been too proud or afraid to admit their mistakes and this has created severe difficulties."

Integrity, Gellman said, "implies that the computer specialist should be more service-centered and less self-centered. He should be more willing to let his customers become involved in specifying what they want in their systems."

Serving the Users

Too often, he said, "some computer specialists try to keep their customers in subordinate positions. I find it hard to see how the computer specialist's employer can achieve full benefits from computer systems if the computer specialist is not interested in serving the users of the systems."

In the area of professionalism, he said, "computer specialists should be less concerned with the forms of professionalism and more with its substance. The computer specialist can only become a professional when he demonstrates the abilities of a professional."

In conclusion, he said, "We computer specialists know that in the long run what is good for computer users will also be good for us. We know that we need to preserve our competence and integrity, and we know how to do it. All we need is the will to do it."

Marketer's Checklist Tells 'Right Way'

YORKTOWN HEIGHTS, N.Y. – The most common mistakes underlying new product failures in the computer industry are "impatience, insufficient planning, lack of market understanding, and too little time, manpower and money to get the product and service across," according to "The Data Marketer's Checklist," a new booklet from consultant William E. Meyer here.

The booklet containing answers to 588 marketing questions points out that it is easy "to lose sight of everything that is involved in getting a product ready for the market."

The wrong way to get into the business, it says, is to develop and manufacture the product with little or no market information and then ask the salesman to perform wonders.

"The right way begins prior to development and manufacture – with the prospective customer getting the facts about his preferences, attitudes and problems."

The booklet costs $5 from the mailing address of Box 444, Shrub Oak, N.Y. 10588.

'Reliability Responsible for Success'

Nixdorf Plans Expanded Support for U.S. Penetration

By Edward J. Bride
Of the CW Staff

PADERBORN, West Germany – A company can't stand on its own feet without a support organization proportional to its size.

This is Nixdorf Computer's philosophy which will guide the company in its new marketplace the U.S.

The failure of Victor Comptometer to install more than 1,000 systems in the four years it was marketing Nixdorf gear stemmed mainly from the small size of its supporting organization, according to the president of the German company, Heinz Nixdorf.

In Europe, Nixdorf has some 29,000 systems installed in a variety of sizes, mostly small entry-level users, but also some large installations with decentralized applications, he said.

Nixdorf made his comments during the announcement of the acquisition of Victor's computer division [CW, Nov. 29].

Service Expansion

The imminent expansion of the sales and service facilities of the old Victor computer division – rather than the sale of the division itself – is seen as the event with the most significance to users.

When Nixdorf officially takes over the division Jan. 1, it will begin the long process of increasing its staff, from 470 to about 1,000 the first year, then doubling it in the second year, and perhaps doubling it again within four years.

What this means to customers is a guarantee that any system's problems will be resolved within four hours, according to Nixdorf.

The ability to fulfill this promise stems from the modularity of the System 820, the company's intelligent terminal, Nixdorf said. Since components are replaced in the field and repaired at local service offices, there is little problem in getting users "up and running in four hours," he said.

This reliability, according to Nixdorf, is responsible for the success in selling, and can only be assured by an expansive support organization.

To be a "fully running company" on a nationwide basis, he said, a firm must have 2,000 people in its organization. Without specifically breaking down this number into functions, Nixdorf did say his salesmen are fully responsible for installing systems, and not just selling them.

Company Profile: A New Marketplace

He also noted the current ratio within the European operation is 3.2 employees supporting every salesman, comprised mainly of systems development and administrative personnel.

New U.S. Facilities

Besides building two training centers for his new employees in the U.S. – one on each coast – Nixdorf foresees the possible construction of manufacturing plants. This decision will probably be delayed until company officials can assess the success of the U.S. expansion, and the possible need to export U.S.-built equipment for European marketing.

The president said all plans will be finalized on the basis of how they will impact new or potential users.

Potential users of Nixdorf's systems include those interested in communications-oriented, data-gathering applications, such as those performed with Singer System Ten gear, or small business users that might be using EAM equipment or small systems like the Burroughs L series.

In fact, Nixdorf insisted, "Burroughs is the only competitor I recognize" in the small, general-purpose area.

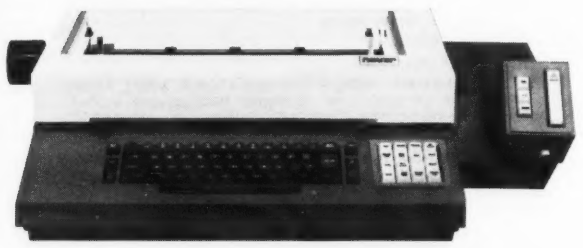
If Nixdorf's contention is correct – that U.S. users have been oversold on owning their own high-powered systems – then he might also find some customers within IBM's base of System 3 users.

The low end of the 820 is a magnetic-stripe computer, and only at the upper end does it approach the speed and power of the S/3, Nixdorf sources indicated.

The Nixdorf 820 ranges in size from about 5K to 30K bytes, and in price from around $3,000 to $30,000, with many options available, like cassettes for data entry.

Other Nixdorf equipment that will eventually be available to U.S. customers includes the Model 700 point-of-sale gear, and the larger 900 disk system, an upward move from the 800 series.

These systems will not be actively marketed yet, Nixdorf said, because of the inability to support them on a wide basis, and because Europe is apparently exhausting the supply, under current manufacturing schedules.



European Leasing Race Tightened By Consortium

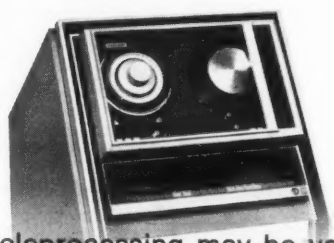
LONDON – U.S. leasing companies planning to enter the European market will get strong competition from a new consortium with offices in 10 different countries.

Synerlease, backed by some of Europe's largest banks, will have inventory of equipment with a value of over $250 million.

The consortium, set up under French law as a "Groupement d'Interet Economique," which enables firms with common interests to work together while preserving their separate entities, has member countries in Belgium, France, Germany, Holland, Italy, Spain, South Africa, Switzerland, the UK and one in the U.S.

Members of Synerlease are, for the most part, subsidiaries or associates of Locafrance S.A., said to be the largest leasing organization in France. The UK member is Channel Leasing Ltd.

Promodata, a Locafrance subsidiary, is currently active in introducing IBM 370s into the Synerlease companies, whose portfolios already include a number of 155s and 165s, a wide range of 360 equipment and several Honeywell machines.



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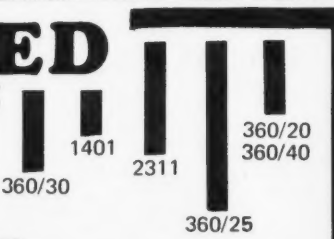

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On the Software Scene

3 of 4 Firms Show Revenue Rise

Earnings and revenues improved for Informatics Inc., Comress and Applied Data Research, Inc. for periods ended in September, but at Computer Sciences Corp. the story was different.

At Informatics, revenues from all commercial operations increased by over $1 million during the first six months compared with the previous year, observed President Walter F. Bauer. Also, revenues from government agencies other than the National Aeronautics and Space Administration showed "significant" improvement, he said.

Sales of the ICS IV/500 communications system product, the Mark IV file management system and data base services contributed greatly to the increases, he added.

In the six months ended Sept. 23, revenues rose to $8.9 million from $8.4 million a year ago, while earnings soared to $231,000, or 15 cents a share compared with a loss of $79,000, or 5 cents a share.

In July 1971 Informatics closed its Los Angeles data center and in November sold its majority interest in Dataplan, Inc.

Investments were made during the six months in new message-switching systems, in marketing the Mark IV and in development of unannounced products, he added.

"Although our efforts in these areas will not contribute substantially to the company's revenue and profits for a year or more, our continued strong cash position made the expenditures appropriate at this time," Bauer noted.

Comress Improves

Despite a poor third quarter, Comress showed improved earnings and revenues in the nine months ended Sept. 30.

Revenues reached $4.8 million from $3.6 million a year ago, while earnings totaled $246,400, or 4 cents a share compared with $190,800, or 3 cents a share in the year-ago period, when the firm had a $173,900 special credit.

In the third quarter, Comress showed a loss of $3,300 due to including losses of $96,700 of affiliated companies under the equity method of accounting, according to President Fred C. Ihrer. In the same 1971 period, earnings totaled $107,100, or 2 cents a share.

Revenues for the period rose to $1.5 million from $1.1 million last year, and income from operations was up sharply in the period, to $93,400 compared with a loss of $19,800 in the same 1971 quarter.

The results for 1971 were restated to reflect a deferral of income into subsequent periods resulting from a year-end audit adjustment and to give effect to using the equity method of accounting for the loss in unconsolidated affiliated companies.

Applied Data Research showed nine-month revenues rising to $6.4 million from $4.5 million in the restated 1971 period.

Earnings, after a $31,720 special credit, totaled $27,517, or 3 cents a share compared with a loss of $286,629 in the 1971 period.

After a $12,969 loss from operations discontinued or sold, the firm showed a net loss of $4,203 before the special credit boosted the results into the profit column.

Although Computer Sciences showed a loss for the quarter and six months ended Sept. 29, the results were "in line" with expectations and "reflect the impact of the costs required to complete the development phase of Infonet," observed William R. Hoover, president, in his letter to shareholders.

In the quarter, revenues declined to $34.3 million from $36.1 million, with a loss of $595,000, or 4 cents a share compared with earnings of $1.1 million, or 8 cents a share last year.

The 1971 revenues included $7.2 million for the sale of the firm's interest in Computax Services Inc.

In the half year, revenues also declined slightly to $65.8 million from $65.9 million, and the loss totaled $1.8 million, or 13 cents a share compared with earnings of $2.3 million, or 17 cents a share in the year-ago period.

Total revenues from Infonet reached $1.1 million for September, and the customer base expanded to 1,150, Hoover added.

Ampex Breaks Into Black

REDWOOD CITY, Calif. – The sale of previously leased Ampex DP equipment to North American Corp. helped boost Ampex Corp. into the black in the second quarter ended Oct. 28.

Ampex has been reporting sizable losses for more than a year and a half. Earnings for the period totaled $271,000, or 2 cents a share, on revenues of $78 million, cutting the loss for the first half to $2.9 million on revenues of $146.8 million.

Comparison with year-earlier results wouldn't be meaningful, Ampex said, because auditors had certified 1971 and 1972 operating results together. The 1972 loss was $89.7 million while in 1971 the loss was $12 million.

Sales of video and magnetic tape product lines continued to improve during the period, noted President Arthur H. Hausman.

Storage Technology Revenues Soar, Earnings Rise in Half, Quarter

LOUISVILLE, Colo. – Storage Technology Corp. continues to enjoy being in the production, rather than development, phase of manufacturing, and the three-month and nine-month reports reflect the change.

As of the end of October, annual revenue value of company-owned equipment on rent was about $10 million, and the company had firm orders for the rental of additional equipment which would bring in about $7.8 million annually in rentals, the firm said.

A portion of the backlog will be sold when installed, STC added.

There is also a backlog of over $3 million in orders for outright sales.

In the quarter ended Sept. 29, STC earned $1.2 million, or 35 cents a share compared with a loss of $766,000, or 24 cents a share last year. A $750,000, or 22 cents a share tax credit was included in the 1972 figure. Revenues this year totaled $8.4 million compared with $1.5 million a year ago.

Nine-month earnings, including a $1.2 million, or 38 cents a share tax credit, rose to $2.2 million, or 66 cents a share compared with a loss of $3.9 million, or $1.48 a share in the year-ago period. Revenues also zoomed, to $18 million from $1.7 million.

STC has established a German subsidiary, Storage Technology GmbH, and installed two tape subsystems in Japan. The firm has also branched into the disk line, and installed its first 3330-type subsystem at a customer's site. It expects to install its first 370/155 type add-on memory this month.

'Despite Transition'

Memorex Reaps Profit in 9 Months

SANTA CLARA, Calif. – Despite a "major transition" in product lines, Memorex Corp. managed a reversal of last year's nine-month report, with earnings of $582,000, or 15 cents a share compared with a loss of $5.3 million, or $1.35 a share in 1971.

Total revenues rose to almost $106 million, up 31% from $80.6 million in the three quarters ended Sept. 30, 1971. A substantial boost in rental and service revenues more than overcame the decline in sales revenue. Rental and service income rose to $57.4 million from $30 million in the period last year, while sales declined to $48.6 million from 50.6 million.

Memorex has ceased production of the 3660 disk system, and is making the IBM 370-compatible 3670. Backlog for the new system has committed the company's facilities through the second period of 1973, according to President Laurence L. Spitters.

In addition, Memorex has obtained 100% interest in ILC Peripherals Leasing Corp., previously 20% owned by Memorex. The unit is expected to be profitable in the fourth quarter, following three quarters of losses.

The expected profit from ILC will stem from "significant improvement in the on-rent status of ILC's equipment for lease and an approximate $1 million interest cost reduction" resulting from refinancing.

The new MRX/40 and 50 mainframes have been rolled out the door, and shipments of a "modest volume" are expected in the fourth quarter.

Memorex is retaining its deferral method of accounting. Under this system, as of June 30, the firm had deferred expenses of $41 million, while "stated" net worth, before deferrals, was about $26 million, for a "negative" net worth of about $15 million, if it wrote off its deferrals.

Amounts deferred on the development of the MRX systems and the 3670 disk system prior to first shipments "approximate two-thirds of the balance of Memorex's deferred research and development costs," the firm said. The deferred costs are scheduled to be amortized against expected unit shipments during the next three years.

"The impressive year-to-year increase of rental revenues recorded for the first nine months of 1972 reflects the growth of the combined Memorex/ILC base of computer equipment for lease," Spitters said.

"The continued profitability of our business during the third quarter is evidence of the stability of results of this large leasing business and it is especially satisfying because profits have been maintained in spite of the fact that a major transition has been made in our equipment manufacturing business to new computer products," he observed.

"The 3660 equipment continues to enjoy an excellent deman by lessees," he noted.

Vermont Research Sets Turnaround

SPRINGFIELD, Vt. – Some belt tightening, changes in manufacturing procedures and good cash flow enabling the firm to retire a "sizable amount of debt," all contributed to the turnaround scored by Vermont Research Corp., maker of drum memories.

In the year ended Sept. 30, earnings rose to $790,000, or $1.19 a share compared with last year's loss of $703,000, or $1.06.

Acquisitions

Electronic Associates Inc. has purchased the peripheral products line from **GDI Inc.** for an undisclosed amount of cash.

Western Union Corp. has agreed to acquire **Comsi Inc.**, a service firm, for an exchange of stock. Comsi will function as a wholly owned subsidiary of Western Union Corp., but its operations will become an integral part of Teleprocessing Industries Inc., another subsidiary.

Management Data Corp. has sold its subsidiary, **MDC Data Centers Inc.**, to **Praxa Corp.** for $560,000 and repayment of $190,000 of the subsidiary's indebtedness to Management Data.

Central Data Systems Inc. has acquired **Computab Inc.**, a DP service firm specializing in direct mail applications.

Shareholders of **Cascade Data Inc.** have approved the acquisition of Cascade by **Apeco Corp.**

Data Instruments Co. has agreed in principle to acquire **Information Resources Corp.** Both companies manufacture data acquisition equipment.

Recognition Equipment Inc. (REI) and **Corporation S** have agreed in principle on the merger of Corporation S into REI for an exchange of stock at the rate of one share of REI for seven shares of Corporation S common.

United Data Centers Inc., a network of data centers, has agreed in principle to acquire **Centralized Accounting, Inc.** for an undisclosed amount of stock.

Terminal Data Corp. has acquired an option to buy **Precision Dipbraze TOR, Inc.**, a heat exchanger manufacturer.

Scientific Software Corp., a services firm, has acquired **Gathers & Associates**, a Denver, Colo., commercial DP and programming company.

Anderson Jacobson, Inc. has agreed in principle to acquire **Dicom Industries, Inc.**, manufacturer of minicomputer cassette memory systems. The transaction is subject to approval by Dicom shareholders.

Singer Co. has agreed in principle to acquire the **Electronic Store Information Division** of Nuclear Data. The ESI division produces point-of-sale systems for supermarkets and drug stores.

GTE Information Systems and **EDP Resources Inc.** have signed a letter of intent for the acquisition of EDP Resources' 75% interest in its West German subsidiary, EDP Resources Deutschland AG, by GTE Information Systems.

TRADE★QUOTES®

Computerworld Stock Trading Summary

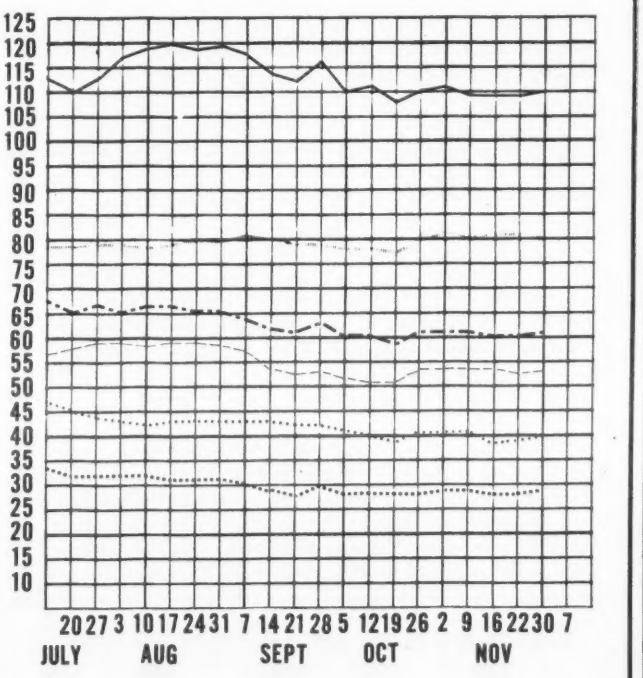
All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

CLOSING PRICES WEDNESDAY, NOVEMBER 30, 1972

EXCH		1972 RANGE (1)	CLOSE NOV 30 1972	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 3	2	+ 3/8	+23.0
A	APPLIED DATA RES.	3- 7	3 1/4	0	0.0
O	APPLIED LOGIC	1- 4	3 3/8	+ 1/4	+8.0
N	AUTOMATIC DATA PROC	72- 99	90 1/2	-4 1/2	-4.7
O	BRANDON APPLIED SYST	1- 2	1	+ 1/4	+33.3
O	COMPUTER DIMENSIONS	5- 14	4 3/4	+ 1/4	+5.5
O	COMPUTER DYNAMICS	1- 4	1 1/4	- 1/8	-9.0
O	COMPUTER NETWORK	3- 7	5 1/4	+ 3/4	+16.6
N	COMPUTER SCIENCES	4- 10	4 3/4	+ 1/2	+11.7
O	COMPUTER TASK GROUP	1- 2	1 1/4	0	0.0
O	COMPUTER TECHNOLOGY	3- 8	3	-1	-25.0
O	COMPUTER USAGE	7- 14	8 1/8	+ 1/4	+3.1
O	COMP AUTOMOT REPORTS	5- 9	7 5/8	+ 1/8	+1.6
N	COMPUTING & SOFTWARE	14- 28	16 1/2	+ 1/4	+1.5
O	COMRESS	1- 3	1	- 1/8	-11.1
O	COMSHARE	5- 10	7 3/8	- 1/8	-1.6
O	DATATAB	5- 9	4 3/8	0	0.0
O	EDP RESOURCES	2- 8	2 3/4	- 1/4	-8.3
A	ELECT COMP PROG	1- 5	1 1/2	- 1/8	-7.6
N	ELECTRONIC DATA SYS.	43- 65	60	+ 3/4	+1.2
O	INFORMATICS	5- 11	4 7/8	- 1/4	-4.8
O	I.O.A. DATA CORP	1- 3	1	0	0.0
O	KEANE ASSOCIATES	4- 7	4	0	0.0
O	KEYDATA CORP	7- 13	10 5/8	+ 3/8	+3.6
O	LOGICON	4- 9	4 7/8	- 1/8	-2.5
A	MANAGEMENT DATA	4- 10	5 3/8	+ 3/8	+7.5
O	NATIONAL CSS INC	8- 31	29	- 1/4	-0.8
O	NATIONAL INFO SRVCS	2- 5	1 5/8	0	0.0
P	ON LINE SYSTEMS INC	8- 28	25 1/4	-1 3/4	-6.4
N	PLANNING RESEARCH	6- 17	8 3/4	+ 5/8	+7.6
O	PROGRAMMING METHODS	20- 25	24 3/4	- 5/8	-2.4
O	PROGRAMMING & SYS	1- 2	1	0	0.0
O	RAPIDATA INC	5- 27	26	+1 1/4	+5.0
O	SCIENTIFIC COMPUTERS	2- 4	2	0	0.0
O	SIMPLICITY COMPUTER	1- 5	2 7/8	+ 3/8	+15.0
O	TBS COMPUTER CENTERS	3- 6	3 1/4	0	0.0
O	TCC INC	1- 3	5/8	0	0.0
O	TYMSHARE INC	7- 11	8 1/2	0	0.0
O	UNITED DATA CENTER	5- 8	6	- 1/4	-4.0
N	UNIVERSITY COMPUTING	9- 26	10 5/8	+ 7/8	+8.9
A	URS SYSTEMS	6- 10	7 3/8	0	0.0
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	34- 49	38 1/8	+3 3/8	+9.7
O	ADVANCED MEMORY SYS	12- 23	17	- 7/8	-4.8
N	AMPEX CORP	5- 15	7	- 1/8	-1.7
O	ANDERSON JACOBSON	5- 8	4	- 7/8	-17.9
O	ATLANTIC TECHNOLOGY	1- 11	1/4	0	0.0
O	BEEHIVE MEDICAL ELEC	1- 6	7 5/8	+1 3/8	+22.0
A	BOLT,BERANEK & NEW	5- 21	13 1/8	- 7/8	-6.2
N	BUNKER-RAMO	9- 14	9 7/8	0	0.0
A	CALCOMP	9- 25	10 1/8	+ 7/8	+9.4
O	CAMBRIDGE MEMORIES	9- 15	9 1/2	-1	-9.5
O	CENTRONICS DATA COMP	6- 27	23 1/2	- 1/2	-2.0
O	COGNITRONICS	2- 5	2 1/4	+ 1/8	+5.8
O	COMPUTER COMMUN.	1- 7	3 1/2	0	0.0
A	COMPUTER EQUIPMENT	2- 4	2 1/2	0	0.0
O	COMPUTER MACHINERY	7- 13	10 1/2	+ 7/8	+9.0
A	COMPUTEST	3- 9	4 3/4	+ 5/8	+15.1
A	DATA PRODUCTS CORP	3- 7	4	+ 1/8	+3.2
O	DATA RECOGNITION	1- 5	1 1/4	- 1/4	-16.6
O	DATA TECHNOLOGY	2- 5	2 3/4	0	0.0
O	DI/AN CONTROLS	0- 8	4 3/8	- 1/8	-2.7
N	ELECTRONIC M & M	3- 8	5 1/4	+1 1/8	+27.2
O	FABRI-TEK	2- 5	3 3/4	+ 1/4	+7.1
O	GENERAL COMPUTER SYS	7- 16	7	- 1/4	-3.4
N	GENERAL ELECTRIC	59- 70	67 7/8	+ 1/4	+0.3
N	HAZELTINE CORP	7- 13	9 5/8	+1 1/4	+14.9
O	INFOREX INC	20- 36	25 3/4	+4 1/8	+19.0
O	INFORMATION DISPLAYS	1- 5	1 1/8	- 1/8	-10.0
A	LUNDY ELECTRONICS	8- 14	8 3/8	+ 5/8	+8.0
O	MANAGEMENT ASSIST	1- 2	3/8	0	0.0
A	MILGO ELECTRONICS	15- 44	21 3/8	+4	+23.0
N	MOHAWK DATA SCI	12- 27	14 1/2	+1 3/8	+10.4
O	OPTICAL SCANNING	6- 16	7 1/4	- 1/4	-3.3
O	PERTEC CORP	8- 17	8 7/8	+ 5/8	+7.5
O	PHOTON	6- 15	8 1/4	+1 1/4	+17.8
A	POTTER INSTRUMENT	7- 21	9 3/8	+ 3/8	+4.1
O	PRECISION INST.	3- 13	3 1/4	0	0.0
O	RECOGNITION EQUIP	5- 15	8	- 1/2	-5.8
N	SANDERS ASSOCIATES	13- 21	16 3/4	0	0.0
O	SCAN DATA	5- 13	5	0	0.0
O	STORAGE TECHNOLOGY	17- 39	30 1/8	+2	+7.1
O	SYCOR INC	7- 11	10	- 3/4	-6.9
O	TALLY CORP.	8- 15	10	- 1/4	-2.4
N	TEKTRONIX INC	34- 64	47 1/2	+1 3/8	+2.9
N	TELEX	6- 15	6 1/2	+ 1/4	+4.0
O	WILTEK INC	10- 26	17 3/4	+2 1/4	+14.5
	SUPPLIES & ACCESSORIES				
O	BALTIMORE BUS FORMS	6- 9	5 1/2	- 3/4	-12.0
A	BARRY WRIGHT	9- 14	11 3/4	+ 1/4	+2.1
A	DATA DOCUMENTS	17- 26	21 3/8	+ 1/8	+0.5
O	DUPLEX PRODUCTS INC	8- 16	9 1/2	0	0.0
N	ENNIS BUS. FORMS	6- 10	6 3/4	- 1/8	-1.8
O	GRAHAM MAGNETICS	15- 27	15	-1	-6.2
O	GRAPHIC CONTROLS	11- 15	11 1/4	- 5/8	-5.2
N	3M COMPANY	76- 86	84 7/8	+1 1/8	+1.3
O	MOORE CORP LTD	42- 57	56 5/8	+1 5/8	+2.9
N	NASHUA CORP	48- 62	57 1/2	+1	+1.7
O	REYNOLDS & REYNOLD	37- 77	49 1/4	+ 3/4	+1.5
O	STANDARD REGISTER	14- 20	15 1/4	- 7/8	-5.4
O	TAB PRODUCTS CO	14- 23	21 1/2	- 3/4	-3.3
N	UARCO	21- 28	23 7/8	+ 3/8	+1.5
A	WABASH MAGNETICS	6- 11	6 7/8	0	0.0
N	WALLACE BUS FORMS	21- 26	24 5/8	- 1/4	-1.0
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	147-226	215	+ 3/4	+0.3
N	COLLINS RADIO	14- 20	18 3/4	- 1/4	-1.3
N	CONTROL DATA CORP	43- 78	61 1/2	+1	+1.6
O	DATA GENERAL CORP	56-115	104	-1 1/2	-1.4
O	DIGITAL COMP CONTROL	9- 25	5 1/4	-1 1/4	-19.2
N	DIGITAL EQUIPMENT	72-101	88 3/4	+ 3/4	+0.8
N	ELECTRONIC ASSOC.	6- 13	9 3/4	+1 1/8	+13.0
A	ELECTRONIC ENGINEER.	6- 14	8 5/8	- 1/8	-1.4
N	FOXBORO	23- 41	29	+2	+7.4
O	GENERAL AUTOMATION	13- 39	36 1/4	- 1/4	-0.6
O	GRI COMPUTER CORP	2- 5	2 3/8	- 1/8	-5.0
N	HEWLETT-PACKARD CO	46- 77	74	+ 1/4	+0.3
N	HONEYWELL INC	118-170	127 7/8	+5 3/8	+4.3
N	IBM	333-426	391	-3	-0.7
O	INTERDATA INC	8- 16	10 1/8	- 1/8	-1.2
N	MEMOREX	15- 38	17 1/4	+ 3/4	+4.5
O	MICRODATA CORP	5- 10	8	+ 1/2	+6.6
N	NCR	29- 38	32 3/4	+ 3/4	+2.3
N	RAYTHEON CO	27- 47	35 1/2	+ 3/4	+2.1
N	SPERRY RAND	30- 49	47 3/8	+1 5/8	+3.5
A	SYSTEMS ENG. LABS	7- 16	8 5/8	+ 1/4	+2.9
N	VARIAN ASSOCIATES	14- 22	17 7/8	+ 3/4	+4.3
N	VICTOR COMPTOMETER	15- 24	17 3/4	- 7/8	-4.6
N	WANG LABS.	23- 61	26 1/8	- 1/2	-1.8
N	XEROX CORP	121-172	149 3/4	+1 1/2	+1.0
	LEASING COMPANIES				
A	BOOTHE COMPUTER	3- 18	4	+ 5/8	+18.5
O	BRESNAHAN COMP.	1- 3	1 3/8	- 1/4	-15.3
O	COMDISCO INC	3- 18	13 1/2	-1	-6.8
O	COMMERCE GROUP CORP	5- 11	5 5/8	- 1/8	-2.1
O	COMPUTER EXCHANGE	1- 3	7/8	+ 1/4	+40.0
A	COMPUTER INVSTRS GRP	7- 14	7 1/8	+ 3/8	+5.5
N	DPF INC	5- 13	6	0	0.0
M	DATRONIC RENTAL	2- 4	2	- 1/2	-20.0
A	DCL INC	2- 10	3 1/2	+ 1/2	+16.6
A	DEARBORN-STORM	16- 26	22 3/8	+ 3/4	+3.4
A	DPA, INC.	5- 8	7 7/8	- 3/8	-4.5
A	GRANITE MGT	5- 11	5 7/8	0	0.0
A	GREYHOUND COMPUTER	6- 11	6 3/8	- 5/8	-8.9
A	ITEL	7- 12	10 3/8	+ 3/4	+7.7
N	LEASCO CORP	17- 24	21 7/8	+2 5/8	+13.6
O	LEASPAC CORP	6- 15	7 5/8	+ 1/2	+7.0
O	LECTRO MGT INC	1- 4	2	- 1/8	-5.8
A	ROCKWOOD COMPUTER	2- 7	3	+ 3/4	+33.3
O	SYSTEMS CAPITAL	3- 20	12 1/2	+ 3/4	+6.3
N	U.S. LEASING	19- 33	29 1/2	- 1/2	-1.6

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
P=PHIL-BALT-WASH
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Computer Stocks Trading Index



Earnings Reports

DATA PRODUCTS
Three Months Ended Sept. 23

	1972	1971
Shr Ernd	$.06	$.02
Revenue	13,598,000	11,090,000
Disc Op	.....	(12,000)
aSpec Cred	162,000	130,000
Earnings	408,000	127,000
6 Mo Shr	.11	.03
Revenue	27,525,000	24,449,000
Disc Op	.....	(42,000)
aSpec Cred	325,000	130,000
Earnings	757,000	217,000

a-In 1972, tax credit less loss on sale of securities; in 1971, tax credit.

ELECTRONIC MEMORIES & MAGNETICS
Three Months Ended Sept. 23

	1972	a1971
Shr Ernd	$.14	$.08
Revenue	21,293,000	19,730,000
Disc Op	.....	(290,000)
Tax Cred	400,000	231,000
Earnings	1,030,000	716,000
9 Mo Shr	.08	.39
Revenue	57,663,000	56,743,000
Disc Op	.....	(432,000)
Tax Cred	1,138,000	1,374,000
Earnings	1,247,000	2,918,000

a-Restated.

XEROX
Three Months Ended Sept. 30

	a1972 (000)	1971 (000)
Shr Ernd	$.80	$.68
Revenue	604,981	493,329
Earnings	63,046	53,236
9 Mo Shr	2.33	1.98
Revenue	1,766,046	1,442,222
Earnings	183,536	155,651

a-Includes results of Diablo Systems Inc. acquired in a pooling-of-interests.

COMPUTER COMMUNICATIONS
Year Ended June 30

	1972	a1971
Revenue	$6,189,952	$2,534,509
Disc Op	(367,941)	(1,477,239)
Spec Item	764,478	(260,000)
Loss	1,845,553	3,661,708

a-Restated to reflect discontinuation of two previously wholly owned subsidiaries.

SIMPLICITY COMPUTER
Nine Months Ended July 31

	1972	1971
Shr Ernd	$.30	$.18
Revenue	2,060,580	1,526,366
Earnings	152,049	92,297

WABASH MAGNETICS
Nine Months Ended Sept. 30

	1972	1971
Shr Ernd	$.29	$.15
Revenue	20,711,235	16,167,949
Earnings	507,479	264,973

INFORMATICS
Six Months Ended Sept. 23

	1972	a1971
Shr Ernd	$.15	$.05
Revenue	8,943,000	8,400,000
Disc Op	.....	(140,000)
Earnings	231,000	79,000

a-Restated.

BARRY WRIGHT
Three Months Ended Sept. 30

	1972	1971
Shr Ernd	$.20	$.15
Revenue	7,597,254	6,235,169
Spec Item	a3,288	b68,582
Earnings	330,059	264,481
9 Mo Shr	.64	.30
Revenue	23,336,991	19,968,160
bSpec Cred	102,088	68,582
Earnings	1,058,262	512,268

a-Debit; from sale of land and plant relocation costs. b-Credit; from sale of land and relocation costs.

Dear Ma: This cartoon reminded me of our data network-until Vadic.

Ma Bell
195 Broadway
New York, NY 10007

Dear Ma:

This cartoon reminded me of our data communications network. That is, until Vadic came along with their planned family of second generation 300 and 1200 baud modems and automatic dialers.

At our computer site, we installed Vadic's MDS system (center) where up to 16 Bell 103 & 202 compatible modems and 801 type auto calling units can be freely intermixed in just 7-inches of rack space. In remote locations, we use either Vadic's 4-channel box (left) which houses up to 4 modems (or a modem & a dialer), or Vadic's 1 & 2 channel stand-alone units (right).

Sure, the modems work great. But it's Vadic's systems understanding, their applications backup, and the built-in displays and diagnostics, that make it so simple to monitor & troubleshoot both ends of our data network.

Our operators can loopback data to check out the terminal, the modem, & the phone line, and can watch computer and terminal activity through display of <u>all</u> EIA leads – at both ends! Vadic's powerful diagnostics, plus built-in 300/1200 baud test signals, make it easy to completely test any channel. No wonder our system uptime is so much greater these days!

Better send for Vadic's new brochure, Ma. It's "must" reading for data comm people. See you soon.

P.S. Who's Vadic? They've delivered over <u>15,000</u> <u>modems</u> in the past 3 years.

Your son, the independent thinking communications manager

Alexander Graham Jr.

vadic

THE VADIC CORPORATION • 505 E. MIDDLEFIELD RD. • MOUNTAIN VIEW, CA 94040 • (415) 965-1620